WORKSHOP WRINKLES FOR DECORATORS PAINTERS ETC.

W. NORMAN BROWN

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WORKSHOP WRINKLES

WORKSHOP WRINKLES

FOR

DECORATORS, PAINTERS, PAPERHANGERS AND OTHERS

EDITED BY

WILLIAM NORMAN BROWN

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"HOUSE DECORATING AND PAINTING" "A HISTORY OF DECORATIVE ART"

"JAPANNING FOR CYCLES, BEDSTEADS, TINWARE" ETC.

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THE GETTY CENTER

PREFATORY NOTE

IN compiling the following "Wrinkles," I have endeavoured to meet the needs of those who may want to find the means of doing a certain job in a hurry, and if these "Wrinkles" are kept in a handy position in the shop, I venture to think that many workmen will find the little volume at different times very useful, while the information, being arranged alphabetically under four heads, is also very easily "get-at-able."

W. N. B.

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WORKSHOP "WRINKLES"

DECORATING

Acid-resisting Varnish.—Pour 20 lb. of molten lead into a cast-iron vessel containing about 1 gallon of linseed oil, and stir well. After the mixture has cooled, some 17 lb. of lead will be found at the bottom of the vessel. The lead is again melted and the operation repeated. When this has been done about five times, the oil attains the consistency of ordinary varnish, and is ready for use.

A good Decorator's Mastic.—A good putty or mastic, suitable for decorators' use, may be prepared by taking 9 parts of well-dried clay that has previously been purified; this is mixed with 1 part of litharge, and then enough linseed oil is added to the mixture in order to bring it to the consistency of wet plaster. Before applying this mastic, the surfaces that are to be joined should be thoroughly moistened with a sponge; this is particularly necessary in the case of stone or brick work. The mixture takes about five or six days before it is completely hardened, but it possesses great properties of adherence and durability.

Amber Varnishes.—A strong and durable varnish is made by dissolving amber in drying linseed oil. The amber

is to be heated in an iron pot over a clear red fire till it is softened and semi-liquefied. The oil, previously heated, is now to be poured in with much stirring in the proportion of 10 oz. to 1 lb. of amber, and after the incorporation is complete and the liquid somewhat cooled, 1 lb. of oil of turpentine must be added. A brilliant amber spirit varnish is thus formed: Fused amber, sandarach, and mastic, of each 4 oz.; rectified spirit, 1 quart. Expose to the heat of a sand-bath, with occasional agitation, till dissolved. The composition is placed in a close copper vessel having a funnel-shaped projection, which passes through the bottom of the furnace by which the vessel is heated.

Antique Oak Woodwork.—This may have olive green walls, gold predominating in the frieze, the ceiling being in vellum, and the upholstery of a pronounced red, with bronze prevailing in the draperies.

Arrangement of Colours.—Avoid all blazing contrasts of colours, such as bright red next bright green, or bright blue next to bright yellow; such contrasts are not harmonious; let one of the two always be subservient to the other. It is not so much what colour a material is, but how that colour is made to appear. It is necessary to bear in mind that all colours have their complementaries, which add to or detract from the beauty of the adjoining colours, according to what they may be. Thus the complementaries of red are green, of blue are orange, of yellow are violet. If you cut out pieces of grey paper in an ornamental form and stick a piece on each of the three colours named, it will be found in a shaded light that the grey will be fully tinted by the complementaries of these colours. But precise rules cannot be laid down. A few contrasts are suggested: Black and warm brown, violet and pale green, violet and light rose colour, deep blue and golden brown,

chocolate and light blue, deep red and grey, marone and warm green, deep blue and pink, chocolate and pea green, marone and deep blue, claret and buff, black and warm green.

Artificial Ebony.—Boil oakwood for forty-eight hours in a solution of alum, and then brush over with a decoction of logwood prepared as follows: Boil 1 part of logwood in 10 parts of water, filter and evaporate to one-half. To each quart of this solution add 12 drops saturated neutral solution of indigo. After the application of the dye, rub the wood with a saturated filtered solution of verdigris in hot concentrated acetic acid, and repeat till the required black colour is attained. Or, boil 2 quarts of water with $\frac{1}{2}$ lb. of logwood, and add 1 oz. pearlash; wash the wood with this first, and then with the following wash: 2 quarts of water boiled with $\frac{1}{2}$ lb. of logwood, $\frac{1}{2}$ oz. sulphate of iron, $\frac{1}{2}$ oz. acetate of copper, and $\frac{1}{2}$ lb. rusty steel filings. Or, dip in a solution of logwood. When dry, rub clean and dip in a solution of bichromate of potassium; dry, and rub again. Or, wash repeatedly in a solution of sulphate of iron. Dry, then wash repeatedly in hot solution of logwood. Dry, wash with water and sponge. Dry and rub with linseed oil.

Asbestos Enamel.—Powdered asbestos for making an enamel or coating to be applied to pipes, walls, etc., can be made by mixing the powder with soluble salts, such as silicate of potash, and mineral or other colours which combine with silicic acid, so as to form a product which resists the action of oxygen, heat, cold, or damp. The coating furnishes a refractory glaze which protects the material it is applied to.

Ash Woodwork.—This may have dull sage green walls, with a frieze of sage and ochre and a cornice of ochre, the ceiling being of buff colour, and the upholstery of dull green

picked out with red, and the draperies of ash picked out with dull sage and green.

Black Amber Varnish.—Take of amber 1 lb., fuse, add ½ pint hot drying oil and 3 oz. each of powdered black resin and Naples asphaltum; when properly incorporated and considerably cooled, add 1 pint of oil of turpentine. This is the beautiful black varnish of the coachbuilder, and it is also suitable for metals.

Black Walnut Stain.—Asphaltum thinned with turpentine will stain a beautiful black walnut colour. It must be varnished over.

Bog Oak.—Bog oak colour is a mixture of salmon and drab, being a shade or two darker than antique oak.

Bone-black.—To mix and grind finely powdered bone-black into a medium stiff paste, requires equal portions of pigments and oil by weight, and when so mixed and ground it has only one-eighth to one-tenth the staining power of good lamp-black. In spite of this, when a clear tone is the object in a tint, bone-black is much to be preferred to lamp-black.

Brittle Varnish.—A varnish that powders white when it is rubbed with the finger, or that easily scratches white, is poor in quality. Brittle varnish should not be used even for under-coats, as this may tend to destroy the finish, even if protected by high-class, durable, and elastic finishing varnish.

Brown Ash Woodwork.—This may have old red walls, the frieze of old blue, the cornice of buff, and the ceiling of a lighter shade, whilst the upholstery may be of old gold, red and blue, and the draperies of grey.

Brush Polish.—A polish to be applied by means of a brush is obtained by dissolving 3 lb. of shellac and 3 lb. of refined resin in 25 lb. of alcohol.

Cabinet Work Polish.—A fine lustrous polish for delicate work can be made as follows: ½ pint of linseed oil, ½ pint of old ale, the white of an egg, and 1 oz. of spirits of salt (muriatic acid). Shake well before using. A little to be applied to the face of a soft linen pad, and lightly rubbed for a minute or two over the article to be restored, which should first be rubbed off with an old silk handkerchief. The polish will keep any length of time.

Carmine and its Preparation.—Carmine is prepared by treating a boiling aqueous decoction of cochineal with alum and a salt of an organic acid, such as bitartrate or binoxalate of potassium. It is essential that the vessel or boiler in which the operation is carried on is of tin or well-tinned copper, otherwise the brilliancy of the resulting colour is much impaired. It was formerly a belief that carmine could only be produced on a clear bright day. According to an old German process, 1 lb. of crushed cochineal is boiled in 1 gallon of water for a quarter of an hour, then 1 oz. of powdered alum is added, and the boiling continued for three minutes longer; after this the vessel is removed from the fire, allowed to stand for some time, and then the clear supernatant liquid is decanted into clean receptacles, which are set aside for several days, when about 1½ oz. of carmine is deposited. An additional ½ oz. of inferior quality is obtained by permitting the molten liquid again to repose for a length of time. A French method is to boil 1 lb. of crushed cochineal for fifteen minutes in 10 litres of distilled water, then 30 grs. of cream of tartar are added, and the boiling continued for ten minutes more; 15 grs. of alum are now added, and again boiled for two minutes. The liquid is then

allowed to settle, and as soon as clear is drawn off in flat glass or earthenware pans, in which the carmine deposits.

Cedar Woodwork.—This may have mulberry red walls, the frieze and cornice of lighter shades of red, the ceiling of cream, the upholstery of the same class of reds, olive and gold, and the draperies of old ivory.

Ceiling Decoration.—In ceiling decoration all strong colours should be definitely separated from one another by light lines, fillets, or small mouldings. If the cornice presents any small flat surfaces, a simple conventional flower or geometrical pattern can be often used to good advantage, care being taken not to make it too prominent, and in no way to form a dark moulded frame for a mass of light-tinted ceiling. It is a not very costly matter to lay on a ceiling having small wood mouldings formed into panels, and filled in with some light diaper paper or stencil enrichments filling the panels. A lofty ceiling divided into panels, or sunk coffers, admits of a variety of very rich effects in colours: the sunken parts may be of a blue or dark brown, or red, relieved by gold diapers, the moulded beams being relieved by light lines of bright red, green and white, or by frets. There is plenty of scope for ceiling decoration if only the decorative artist and architect work together.

Ceilings.—It is a somewhat difficult matter in houses where the ceilings are plain, and bordered by cornices of inferior design, to treat them with any amount of colour, but it is generally desirable to tint them a light tone of grey or green to get rid of the extreme glare of pure white. Next the cornice a simple distemper pattern, of a darker shade of the same colour, will often be found effective and useful, or one or two simple lines with stencilled corners. The tinting of the cornices must

materially depend upon their design and contour; if plain moulded cornices, they may be tinted in one or two shades, the lighter tones being always at the top or next the ceiling, and gradually darkening off to the wall decoration. As a general rule, one or two of the tints of the general groundwork of the paper may be used with effect; if, however, the cornices contain the usual ill designed and modelled plaster enrichments, care should be taken to keep them in the background, and to pick them out as little as possible, so as to avoid making their general badness of form and execution too prominent. It is well to remember a few general rules in decoration of ceilings and cornices in which to rely when choosing colour or tints. For instance, in using what are called primary colours on moulded surfaces, remember that yellow increases while blue diminishes in strength : the former should therefore be used in convex, and the latter on concave mouldings. All strong colours should be definitely separated from each other by light lines, fillets, or small mouldings; colours on light grounds appear darker by contrast, while those on dark grounds appear lighter. If the cornice has any broad flat surfaces, a simple conventional flower or geometrical pattern can often be used to great advantage, care being taken not to make it too prominent; the great aim being to keep the general work subservient, and in no way to form a dark moulded frame for the mass of light ceiling. The ordinary system of stencil decoration can be carried out at a very small expense, and with a few good patterns very good effects can be obtained in ceilings, where generally little or nothing is done; nor is it a very costly matter to lay on to the flat ceiling small pine mouldings formed into panels and painted, with the panels filled in with some very light diapers or pattern flock paper or stencil enrichment.

Cherry Stain.—For pine, take rain water, 3 quarts; annatto, 4 oz. Boil in a copper kettle until the annatto is

dissolved; then put in a piece of potash the size of a walnut, keep it on the fire about half an hour longer, and it is ready to bottle for use. To produce rich, fine work use Munich lake, of common quality. This looks remarkably well when polished.

Chestnut Woodwork.—This may have an orange wall, the frieze of deep yellow toned with red and black, and paler colours for the ceiling. The upholstery should be of one prevailing general old blue, and the draperies old blue with orange.

Church Decoration.—The roof, the vault, or the ceiling of a church affords one of the best opportunities for simple decoration in colour that can be found. There is no need to make it always white. There is never any excuse for permitting it to be varnished, though it may with advantage be stained, if of wood. The beauty of gold, that is, certain tones of yellow and orange, as a colour to be used as an open field of colour, all of us realise who have seen it in mosaic work. Blue and red are also very excellent, while the plain undecorated ground is often perhaps more satisfactory than one which shows more evidence of design in conventional forms applied to it. Reserve in the employment of colour and design is often a means of discovering better results than can be obtained by allowing fancy to have a looser rein. It affords breadth, simplicity, and dignity, as well as that much needed quality—repose. And if this last has been secured, that which is most to be desired has been obtained. All restless, fretting, and disturbing combinations are most certainly to be avoided. Abjure everything in schemes for decoration which is more an endeavour to show personal cleverness than to make the object beautiful for its own sake.

Cleaning Marble.—To clean marble, brush the dust off with a piece of chamois, then apply with a brush a good coat

of gum arabic about the consistency of thick mucilage, and expose it to the sun or wind to dry. In a short time it will peel off. If all the gum should not peel off, wash it with clean water and a clean cloth. If the first application does not have the desired effect, it should be tried again. Another method is to rub the marble with the following solution: $\frac{1}{4}$ lb. of soft soap, $\frac{1}{4}$ lb. of whiting, 1 oz. of soda, and a piece of stone-blue the size of a walnut; rub it over the marble with a piece of flannel, and leave it on for twenty-four hours, then wash it off with clean water, and polish the marble with a piece of flannel or an old piece of felt. Another prescription is to take 2 parts of common soda, 1 part of pumice-stone, and 1 part of finely powdered chalk; sift it through a fine sieve, and mix it with water; rub it well over the marble, then wash the marble over with soap and water. A method to take the stains out of white marble: Take 1 oz. of ox gall, 1 gill of lye, $1\frac{1}{2}$ tablespoonfuls of turpentine; mix, and make into a paste with pipeclay; put the paste on over the stain, and let it remain for several days. To remove oil stains apply common clay saturated with benzine. If the grease has remained in long, the polish will be injured but the stain will be removed. Iron mould or ink spots may be taken out in the following manner: Take $\frac{1}{2}$ oz. of butter of antimony and 1 oz. of oxalic acid, and dissolve them in 1 pint of rain water; add enough flour to bring the mixture to a proper consistency. Lay it evenly on the stained part with a brush, and after it has remained for a few days wash it off, and repeat the process if the stain be not wholly removed.

Colourless Varnish.—A colourless varnish can be made by taking 1 lb. of spirits of wine, 4 oz. of gum sandarach, and 1 oz. of Venice turpentine. Put these into a vessel near the fire, mix, and dissolve until ready for using.

Colours.—These are divided into warm and cool shades. Light colours make an object seem much larger than it would appear if full tones were employed. A familiar example of this may be seen when one compares one's feet when encased first in white and then in black shoes. Colours spread or diffuse, so that when two are adjoining they affect each other in appearance. Colouring gives repose to the eye when shadings and shadows are, as in nature, used in true contrast to the lights, and produces the rule for harmony. Examples of neglect of such harmony may frequently be seen. For example, it will be found that rooms with north lights are often decorated with ornaments shaded in greys or cold colours, whereas warm shadings should have been used; and, *vice versâ*, rooms with sunny aspects as a rule should be treated with cold shadings. The choice depends, however, considerably upon the source of the light in the room, whether from direct or reflected rays.

Complementary Colours.—A complementary colour may be defined to mean "any colour which, when placed in combination or contrast with another colour, fills or completes the natural harmony with that colour."

Cream Woodwork.—This style of fitting may have a soft, warm blue wall, with a frieze in ivory tones, with blue tracery; the cornice of the same tones as the frieze, the ceiling of ivory pink, and the upholstery and hangings of muddy amber.

Crimson Stain.—The following is frequently used for decorative work: Ground Brazil, 1 lb.; water, 3 quarts; cochineal, $\frac{1}{2}$ oz.; boil the Brazil wood with water for an hour, strain, add the cochineal, boil gently for half an hour, when it will be fit for use. This is first applied, and then the varnish,

consisting of rectified spirits of wine $\frac{1}{2}$ gallon, 6 oz. gum sandarach, 3 oz. of gum mastic, and $\frac{1}{2}$ pint of turpentine varnish; put the above into a tin can by the stove, frequently shaking till well dissolved; strain, and keep for use. If it is harder than is wished, thin with turpentine varnish.

Dark Mahogany.—Introduce into a bottle 15 grs. of alkanet root, 30 grs. aloes, 30 grs. powdered dragon's blood, and 500 grs. 95 per cent. alcohol, closing the mouth of the bottle with a piece of bladder, keeping it in a warm place for three or four days, with occasional shaking, then filtering the liquid. The wood is first mordanted with nitric acid, and when dry washed with the stain once or oftener, according to the desired shade; then the wood being dried, is oiled and polished.

Dark Walnut.—The stain for this is the same as for light walnut (which see); but after washing with water the darker veins are made more prominent with a solution of acetate of iron.

Dead Surface Varnishes.—Generally speaking, such varnishes are produced by preparing mixtures of solutions of resins with liquids in which they are insoluble. For example, a solution of gum sandarach in ether, when mixed with one-fourth of benzole, gives an excellent imitation of ground glass; so does one of damar resin in benzole, when mixed with ether; while water, instead of ether, renders it semi-opaque. A mixture of benzole with common negative varnish, used by photographers, gives a beautiful dead surface. The proper proportions to be recommended are about as follows: Say 10 parts of sandarach dissolved in 43 parts of ether, to which is added 34 parts of benzole.

Decorating a Room.—In decorating a room the surroundings of that apartment must be taken into consideration before the exact combination and tone of colour which would be best suited to its artistic demands can be arrived at. And even when this has been done, the skill and fancy of the decorator have much to do with the success of the arrangements.

Defects in Varnishes and their Remedies.—In applying oil varnishes to different objects, various defects often make their appearance; these are in many cases very obscure in their origin, although painfully obvious in their effects. The defects may arise through faults in making the varnishes, through defects in the surface of the objects which have been varnished, through faulty methods of application, or through climatic changes. Seeing, therefore, that there are so many factors which produce defects in varnished surfaces, it is no wonder that the causes of such defects are obscure, especially as the varnisher may be of an unobservant character and fail to notice faults at the time the varnish is being applied. Cracks and pinholes: these are often due to climatic changes, especially liable to occur in winter time, when a cold day will follow a hot or warm one. Keeping the object in a warm place for some time will tend to cure this fault, and take care that the varnish cannot get chilled while drying. Peeling, blistering, spots, and crawling are defects which may be traced to a greasy nature of the surface on which the varnish is applied. This may be due to the use of bad pinning, paint, or rubbing the work down with oily rags, or to drops of oil on the surface on which the varnish is applied, and not properly removed in the preparing operations. The remedy consists in preventing the application of oily matters to the surface, and to see that they are thoroughly removed. Sagging: this defect arises from two causes, a very greasy nature of the surface, or from applying the varnish too thickly. The varnisher is tempted to take up too much varnish

on his brush, and unless he takes care to spread this well he will leave it too thick, and then sagging or running down may occur. If in the preparatory processes too thick a coat of paint is put on, the varnish may tend to soften this, and then this defect is liable to occur. Sweating and blurring may be due to defects in the manufacture of the varnish; the gums used have not been properly melted and too much of their volatile constituents left in, or the varnish may have been sent out before it was properly matured. Varnishing on a damp surface will also develop these defects. Deadening may be due to faulty preparation of the varnish, but more often it is due to climatic conditions,—varnishing in too damp an atmosphere, on damp surfaces, in the presence of deleterious gases and vapours, too porous a subject, too large a proportion of driers used in making it,—all of which tend to cause loss of lustre in a varnish, either immediately or after a time. It is difficult under these circumstances to point out a remedy, for one will scarcely know the exact cause in any particular case, and of course it is obvious that the remedy will vary with the cause, and what will do for one case will not do for another. The varnisher should, if he wants to produce a good job, take every precaution to prevent defects arising,—for in this case an ounce of prevention is worth a ton of cure. He should see that his varnish is of good quality, that his cans and brushes are in good condition and clean, that the surface he has to varnish is in proper condition, free from grease, dry, and having a smooth surface. He should never attempt a job in wet or damp weather, and he should take care that, after varnishing, his work is not exposed to any bad influences which will retard the drying and hardening of the varnish.

Drop-Black.—Drop-black is, as a rule, of the greyish black type, not as dense as lamp-black, and does not absorb, pound for pound, one-half the amount of thinner, nor has it much

more than one-sixth of the tinting strength of lamp-black. Its tint with white is also of the brownish grey order, unless blued, but it produces a far cleaner tint than gas carbon black.

Ebonising.—(1) 1 gallon of vinegar, ½ lb. of green copperas, ¼ lb. of china blue, 2 oz. nut gall, 2 lb. of extract of logwood. Boil over a slow fire, then add 1 pint of iron rust. Wash the wood with this. (2) First sponge the wood with a solution of chlorhydrate of aniline in water, to which a little copper chloride has been added. When dry, repeat with a solution of potassium bichromate. Do this two or three times. (3) Boil in 4 quarts of water 1 lb. of logwood, add a couple of handfuls of walnut shells. Boil again, and take out the refuse, add 1 pint of vinegar, and apply boiling. Afterwards dissolve 1 oz. of green copperas in a quart of boiling water, and apply hot. (4) Boil ½ lb. of chip logwood in 2 quarts of water, add 1 oz. of pearlash, and apply hot. Now boil ½ lb. of logwood in 2 quarts of water, as before, and add ½ oz. of verdigris and ½ oz. of copperas, strain, and put in ½ lb. of rusty steel filings. With this go over the work a second time. (5) Into 1 quart of boiling water put 1½ oz. of copperas and 2 oz. of logwood chips. Lay on hot. When dry, wet the surface again with a solution formed of 2 oz. of steel filings dissolved in ½ pint of vinegar. (6) Wash the wood with a concentrated aqueous solution of acetate of iron of 14° Baumé. Repeat this until a deep black is produced. (7) Brush with a strong decoction of logwood chips several times, then give it a coat of vinegar in which rusty nails have been laid. (8) Make a solution of sulphate of iron by dissolving 2 oz. of sulphate in a pint of hot water. Paint the wood repeatedly with this. When dry, apply a hot decoction of logwood and gall nuts two or three times. When this has dried also, clean with a wet sponge before polishing. (9) Stain first with the logwood, applied hot,

to which a little alum has been added, and then brush over with ordinary ink.

Egg-shell Gloss.—This can be obtained in paint-work by preparing with a number of coats carefully rubbed down between each, and by employing plenty of turpentine and a little oil in the last coats—not sufficient, however, to render the job glossy, and yet enough to prevent it from drying entirely flat.

Egg-shell Polish.—An egg-shell polish on wood is obtained by applying, on a piece of rag, a polish made of 3 parts of shellac, 1 part mastic resin, and 1 part sandarach resin, dissolved in 40 parts of methylated spirits.

Fawn Coloured Oak Woodwork.—This may have dark dull-drab walls, with a frieze of Gobelins blue or red; dull drab, Gobelins blue, or red cornice; light drab ceiling; with upholstery of drab, Gobelins blue, and Gobelins red; and draperies of blue and Nile green.

Filling and Staining Wood.—First plane the wood quite level. Then sandpaper the wood well with 00 sandpaper or glasspaper, then wipe the dust off with a soft rag. To fill all holes, cracks, etc., mix 1 part whiting and another of Venetian red; make into a paste by adding shellac polish, work it up with a penknife, and fill up the holes with it. Let the wood stand for a few hours, then sandpaper it down again quite level. When perfectly level, lay the work flat on the bench, then add 1 tablespoonful of Venetian red on the raw wood, which has been previously sized with very thin glue water and well sandpapered. Pour boiling water on the Venetian red; with a soft brush or rag commence to spread all over the work while hot. Let it stand till dry,

then with a soft rag wipe off all superfluous staining. Be careful not to remove the stain itself. Then commence to polish.

Floor Staining.—As a rule, 1 quart of the staining liquid will be found sufficient to cover about 16 square yards of flooring, but different kinds of woods absorb in different proportions, soft woods requiring more for the same space than hard woods. Besides this, 4 lb. of size and 1 quart and ½ pint of the best varnish will be necessary to finish the 16 yards above mentioned, and a good sized painter's brush and a smaller one will also be necessary. If the wood is uneven, it must be planed and rubbed down to a smooth surface, whilst the cracks and spaces between the boards, if very wide, must be "slipped"; that is, small pieces of wood must be fitted in. All nails must be thoroughly knocked down. The floor must next be carefully washed, and allowed to dry thoroughly. For staining, the liquid is poured into a basin and spread all over the floor by the aid of the large brush, the small one being used for the corners and the wainscoting. It is always best to begin staining at the farthest corner from the doorway, and work round so that one's exit may not be impeded. It is also a good plan to work with the window open, if there is no danger of much dust flying in, as the staining dries so much quicker. After the floor is quite covered, the workman may rest for about an hour, during which there is only one thing relative to the work which need be attended to. This is the size, which should be put in a large basin with half a pint of cold water to each pound, and then stood in a warm place to dissolve. Before recommencing work the brushes must be washed; and this is no great trouble, as a little lukewarm water will take out all the traces of the stain, and clean them quite sufficiently. The sizing is then laid on in exactly the same manner as the staining, always being careful to pass the brush

lengthwise down the boards. If the size froths or sticks unpleasantly, it must be a little more diluted with warm water, and sometimes, if the sediment from it is very thick, it is all the better for being strained through a coarse muslin. The sizing takes rather longer than the staining to dry, two or more hours being necessary, even on a warm dry day. Not until it is quite dry, however, can the last finish be put to the work with the varnish. For this it is always safest to get the very best, and to lay it on rather liberally, though very evenly, and over every single inch, as the staining will soon rub off if not protected by it. The best way to ascertain if it is varnished all over is to kneel down and look at the floor sideways, with your eyes almost on a level with it. Thus much for staining and varnishing.

Floor Varnish.—A recipe for a good floor varnish is as follows: Take 2 lb. of pure white borate of manganese, finely powdered, and add it little by little to a saucepan containing 10 lb. of linseed oil, which is to be well stirred and raised to a temperature of 360° Fahr. Heat 100 lb. of linseed oil in a boiler until ebullition takes place, then add to it the first liquid; increase the heat, and allow it to boil for twenty minutes. Then remove from the fire, and filter the solution through cotton cloth. The varnish is then ready for use, two coats of which may be used, with a final coat of shellac if a fine polish is required.

Frosting and Gilding on Glass.—To frost glass, take a small piece of marble, dipped in glasscutters' sand moistened with water, rub over the glass, dipping it frequently in clean cold water. If wanted very fine, finish with washed emery and water. If a chemical frosting is needed, mix together a strong hot solution of sulphate of magnesia and a clear solution of gum arabic; apply warm. Or use a strong solution of

sulphate of sodium warm, and when cool wash over with gum water. For gilding in glass, a size is needed which will retain the gold until the design is fixed, but which may be washed off. This is made by dissolving $\frac{1}{2}$ oz. of isinglass in sufficient water to cover it. When dissolved, add $\frac{1}{2}$ pint rectified spirits of wine, to make up a pint with water. Flood the glass with the solution, lay on the gold with a tip, and after a few minutes raise the glass endways at a slight angle, so that the surplus size may drain off. Allow to remain for twenty-four hours until set, then "pounce" the design into the gold. Next go over the design with oil gold size, in which has been ground some chrome, and thinned with a little boiled oil and turpentine. When this is thoroughly dry, you can wash off the surface gold with water. (1) Starch ground in nut oil with a little sugar of lead, the latter as a drier. Dab on with a brush. (2) Patent driers thinned with linseed oil gilding: Isinglass, 2 grs.; new rum, 2 parts; water, 3 parts. Dissolve the isinglass in the hot water, then add the rum and let it cool. Cleanse the glass with powdered chalk or flour, and then cover it with the liquid. Lay the gold with a tip in the ordinary manner. When completed, stand the glass on its edge to drain. When dry, gently rub it with cotton wool, and if any spots are found ungilded, make them good. To frost glass, make a saturated solution of Epsom salts in hot water, and dab the glass with a piece of sponge dipped in the solution. When the glass dries there will be a coating of crystals of the salts on the surface, and this will render the glass opaque. The process must be renewed as the glass gets dirty. Washing with water will remove the frosting. The size used to cause gold leaf to adhere to glass may be made by dissolving 1 oz. of gelatine in 4 oz. of spirits of wine. For outside windows: Brush evenly over them starch and water, or dab with ordinary glaziers' putty. For inside windows: To a hot clear solution of gum arabic add sulphate of magnesia to saturation. When cold, brush the

solution evenly over the glass on one side only, and allow it to dry. Avoid making bubbles or froth in doing it, as they cause defects. Use a wide camel's hair brush, and lay it on with diagonal strokes. When once done, do not touch it till dry. If unsatisfactory, wash it off with warm water, and repeat the process. (2) Thin gold is used for this purpose, to be purchased at any oil or colour shop. It does not answer to make it in small quantities.

Furniture Oil.—Mix up 1 part alkanet root, 4 parts of shellac varnish, 16 parts linseed oil, 2 parts turpentine, and 2 parts beeswax. Dissolve; let them stand about a week before using.

Gilding on Glass, with Gloss.—Dissolve fish glue (best quality) in soft water (rain water if possible), and prepare a weak solution, which has only a slight sticking capacity when tested with the fingers. Put the sketch or drawing under the glass, which then shows the place to be gilded. Then brush over the surface with the solution of glue, and put the gold leaf on at once; remove the superfluous glue with blotting-paper, only allowing enough to remain to make the gold leaf stick. This done, the operation is repeated with a second layer of gold leaf, so that no cracks show themselves and that the gold has well covered. When this has well dried, take a velvet rag and clean off the gold carefully, and trace the drawing upon it, backing up the letters or ornaments with colour in oil, with drier added, and when the colour is dry wash off the superfluous gold leaf. If the gilded letters are to be shaded or ornamented, then this should be done first. The glue solution must not be too strong, for it will destroy the gloss of the gold. There are many other methods, among which is one in which the fish glue is dissolved in white wine vinegar in place of water. Others use a binder, brandy in which the seeds of

quince have been soaked for some time, and which liquid has been filtered.

Gilding on Plaster of Paris.—To satisfy the absorbent nature of the plaster, brush it over with linseed oil, at intervals of twenty-four hours, till it will absorb no more, then go over it with oil gold size, ground with yellow ochre into a paste. If this size does not work freely, thin it with linseed oil. When this is so far dried as to be just tacky, gild in the ordinary way with gold leaf, using a tip. Press the gold gently but firmly down with a bob of cotton, covered with soft washing leather; then rub off any superfluous gold, and smooth the surface with a second bob of cotton-wool not covered.

Gilding Size.—The size used in gilding should always be allowed to get as dry as possible, while retaining sufficient "tack" to hold the leaf, as the gold will be much more brilliant in appearance than if applied when the size is too soft.

Gold Leaf and How to Use it.—Gold leaf is a thing which it is impossible to manage unless one knows how, and yet we often have occasion to repair gilt articles of various kinds, or "touch up" a picture frame, etc. The usual practice is to apply some of the many gold paints, and the invariable result is a nasty patch, which is worse than the original flaw. Having procured a "book" of gold leaf, lay it flat upon a table and carefully open the first leaf, when the metal foil will lie before you; with a pair of sharp scissors cut off the paper leaf you have just raised; lay it flat upon your hand and rub it on your hair; whether you use pomatum or not there will be sufficient grease to answer the end in view. Now lay the paper upon the foil in the original position and press firmly with the

hand; lift carefully, and the gold will be found adhering. This paper leaf, with foil attached, will now bear to be carried about, and may be cut up with scissors to size and shape required. The same process may next be carried out for as many leaves as may be required. To lay the leaf on, paint the part you have to gild with gold size, and be very accurate, as the leaf will stick to every spot touched; this size will dry rapidly, and when it is not just dry, or "tacky" *i.e.* sticky, cut a piece of the leaf a trifle larger every way than the design, press it firmly, and then lift the paper; do not touch it again till quite dry, when the surplus foil may be removed with a large camel hair brush or "dabber." For illuminations, etc., gum arabic may be used instead of gold size, and may be allowed to dry, breathing upon it for a few seconds when it is desired to apply the gold leaf.

Good French Polish.—Put ½ gallon of methylated spirits of wine into a bottle, then add ¾ oz. of gum benzoin, 3 oz. of gum juniper, 14 oz. of orange shellac, ¼ oz. dragon's blood powder, and ½ oz. powdered borax. Dissolve thoroughly, and strain through muslin.

Graining Mixture in Distemper.—Take equal parts of yellow ochre, burnt sienna, and raw amber, and mix with ale, beer, or vinegar and sugar. Then with a bristle brush spread on the mixture — or, as termed by grainers, "rub in"—as smoothly and evenly as possible; or it may be applied with a sponge, going over only a small portion or panel at a time, for the distemper colours dry quickly. Then, with a graining-comb made of leather or gutta-percha, make the coarse grain by drawing the comb over the surface in a zigzag manner. With a finer steel graining-comb draw over the whole panel again in the same direction, and with a piece of soft muslin folded over the thumb of the right hand make the heavy grain or figures

by wiping out the graining mixture; this done, lightly pass the fine comb over the work again, or with a thin flat bristle brush lightly brush over the surface to blend or soften the heavy lines. Proceed in this manner over all the parts to be grained, and by imitating the real wood as nearly as possible, a very fair piece of work will result. A professional grainer would overgrain, and mottle, and stain, and glaze, etc.

Graining Pine Doors.—A pine door grained with two coats of paint will seldom be found either to drip or crack, although they have been known to blister under certain conditions, but this may be taken rather as the exception than the rule.

Grey.—1 part nitrate of silver dissolved in 50 parts of distilled water; wash twice then with hydrochloric acid, and afterwards with water of ammonia. The wood is allowed to dry in the dark, and then finished in oil and polished.

Imitating Granite.—An old method followed in imitating granite, for splashing the colour on the work in spots, was to use a stiff hair tool, and, having dipped the brush in colour, pressing it against the raised edge nailed to a flat strip of wood, thus causing the bristles to spring over it, and in the act of springing scatter the colour over the surface. The preferable and more modern method is to use sponges for the purpose instead of brushes, some of which are cut up in pieces and so shaped as to get into the mouldings of fillets and other recesses; if pieces of sponge are not sufficiently large, a number may be pierced with a red-hot wire and tied together with indiarubber. The work is usually got up with a white ground, and the working and rubbing in colour is made with the ordinary flatting colour, stained to the shade of the middle tint of the granite. The painter should have mixed and ready for use drop or ivory black

in turpentine, with a little japanner's gold size mixed with it, and a thin mixture of bluish grey; also colours of the tones required for representing the pronounced lines. Transparency is the chief feature of the lines of the real stone, and depth is intensified by causing some of the first colours to appear under the last colour in parts. The crystals that compose granite display a confused irregular arrangement. The colours vary from flesh colour to grey, white, and blue.

Imitation Alabaster.—Coat a statue of plaster of Paris, or of papier-maché, with thick white damar varnish, and then dust it with a pulverised glass. To give it the appearance of Carrara marble, varnish it a second time, and dust it with coarsely pulverised white glass or mica. If the marble veins be first traced on it with some delicate blue pigment, the imitation will be enhanced.

Imitation Mahogany. — French artizans adopt the following treatment for representing mahogany: The surface having been planed and rendered perfectly smooth, the wood is rubbed with dilute nitric acid. Afterwards a filtered mixture of 1½ grs. of dragon's blood dissolved in 1 pint of spirits of wine is added to one-third of a pint of carbonate of soda. This thin liquid is brushed with a soft brush over the wood, a process repeated at short intervals until the wood assumes the external appearance of mahogany, with a mirror-like polish on the surface. Should this brilliancy decline, it may be restored by rubbing the surface with a little cold-drawn linseed oil.

Imitation Marbles.—Good Portland cement, and colours that take on that material, are mixed dry and made into a paste with the least quantity of water added. One paste has to be made for each colour. The different pastes are placed on top

of one another in layers of different thickness. The mass is pressed from all sides and beaten so that the colours of the different parts impress themselves on each other without uniformity. The result is that more or less deep veins penetrate the mass; this is then sawed into plates, which are pressed in a mould for twelve days, during which time it is necessary to keep them moist as long as they are not entirely hardened. The plates are polished in the same way as marble.

Imitation of Wood Carvings.—Old oak or other carvings in low relief may be very effectively and easily imitated by the following process: Procure some basil leather, and wet it thoroughly in warm water in which a small quantity of size or glue has been mixed; wipe it as dry as possible with a cloth, then cut a piece sufficiently large to cover the carving and allow a small margin; lay it upon the carving and press with the fingers all over, in order that the leather may take the shape of the carving as much as possible. Next, with a smooth pointed tool made of bone go over the surface carefully, pressing the leather into all the interstices of the design, and smoothing the larger or bolder portions until all the details have been brought out. This process can only be applied to carved work which is not undercut. If the superfluous moisture has been removed from the leather in the first instance, it may now be taken from the carving without interfering with its shape, but if not, it must be left till partially dry. When taken off, the leather should be placed in a warm place to dry thoroughly, when it will be found to be quite stiff, and may be coated thickly on the back with a layer of gutta-percha, or with the following mixture: Pitch, resin, and plaster of Paris, equal parts; melt the pitch and resin together, and then stir in the plaster of Paris. If a small quantity of wax candle be added to the mixture, it will be rendered

tougher. The imitation may now be applied to the use for which it was intended, and if treated with dark distemper oak stain and oiled, will look wonderfully like genuine carved oak.

Imitation Wax Polish.—An imitation wax polish to a floor may be thus obtained: Mix 5 lb. of whiting, 3 lb. calcined plaster, ½ gallon of raw linseed oil, and 1 quart each of spirits of turpentine and brown japan, with sufficient yellow ochre to tinge the whiting. Then apply three coats of shellac, rub down with pumice-stone and oil, and clean up with brown japan and spirits of turpentine mixed.

Ivory Enamel Woodwork.—This may have warm écru walls with a frieze of old rose, chocolate, and écru, and old rose cornice. A light warm ceiling should be used, and the upholstery should be of old ivory écru and chocolate, and the draperies of capôte blue.

Ivory Gloss on Wood.—There are two kinds of varnish used to produce this white gloss—one a solution of colourless resin in turpentine, the other in alcohol. For the first, pure copal is taken; for the second, 16 parts of sandarach are dissolved in sufficient strong alcohol, to which are added 3 parts of camphor; and, lastly, when all are dissolved by shaking, 5 parts of Venetian turpentine are added.

Japans.—Elasticity is one of the most important requirements in a good japan, and it must, like linseed oil, stand all the contractions and expansions which result from the various changes of temperature. Non-elastic japans will either crack, blister, or peel off in a short time.

Knots.—Exudations of resin from knots of wood frequently cause great disturbance, as the drying of the oil paint is retarded thereby, or after the drying a crust of resin will appear on the coating. To avoid this, it is advisable to burn out the resin from the knot as far as possible with a soldering iron or similar heated article, and subsequently to coat these places, instead of with shellac, with glue size a little stronger than used for binding size colours.

Light Golden Oak Woodwork.—This may have pale blue walls with a frieze of dark golden tint, a cornice of medium golden tint with some blue, and a light golden tint ceiling; the upholstery being of blue with some light yellow, and the draperies of pale blue.

Light Mahogany.—This is the same as for dark mahogany (which see), but the stain should only be applied once. The veins of the mahogany may be imitated by the use of acetate of iron, skilfully applied.

Light Walnut.—Dissolve 1 part of permanganate of potassium in 30 parts of pure water, and apply twice in succession; and, after an interval of five minutes, wash with clean water, and, when dry, oil and polish.

Lilac.—A beautiful lilac for wall painting is obtained by mixing a small quantity of indigo, ground very fine, with water and whiting until the colour is a dark grey, then add rose pink, mix it well together, and a rich lilac is the result.

Mahogany Woodwork.—This may have Pompeian red walls, with a buff ceiling, and Oriental colours for the upholstery and draperies.

Maple Stain.—This can be made with 3 pints of methylated spirits, 8 oz. of orange shellac, 1 oz. pearlash, and ½ oz. dragon's blood, thoroughly mixed.

Matt Varnish.—To 3 parts of ordinary negative varnish add 1 part of finely powdered tartaric acid, shake thoroughly, and allow the mixture to stand for twenty-four hours; then pour off the clear portion, and slightly warm the plate before applying it. The grain is said to be very fine.

Mineral White.—Convert a solution of magnesium sulphate into magnesium chloride by the addition of calcium; 10 per cent. of aluminium chloride is then added. Calcium hydroxide throws down a white precipitate from the mixed solution. A cheaper white is obtained by precipitating a solution of the corresponding sulphates with calcium hydroxide.

Old Oak Woodwork.—This may have Gobelins blue walls, or drab, with a frieze of Gobelins blue, reds, and drabs; a cornice of a light drab, drab and blue ceiling, with upholsterings of russet, and yellow draperies. It may also have old red walls with tones of old red tapestries on the frieze, the cornice of old oak, the ceiling of grey olive, the upholstery of old blue and old reds, and the draperies of antique gold.

Olive Woodwork.—This may have Indian red or Indian yellow walls, the frieze being of dark blue, and the cornice of pale olive. The ceiling should be in ochre, and the upholsterings may be treated in the prevailing red or Indian yellow, and the draperies copper brown.

Outlining Ornaments.—When a gold ornament falls on a coloured ground, it should be outlined with black. When

colour is placed on a gold ground, it should be outlined with a darker shade of its own colour. When an ornament falls on a ground which is in direct harmony with it, it must be outlined with a lighter tint of its own colour; thus when a red ornament falls on a green ground, the ornament must be outlined with a lighter red. When the ornament and the ground are in two tints of the same colour, if the ornament is darker than the ground, it will require outlining with a still darker tint of the same colour; but if lighter than the ground, no outline will be required.

Pale Green Woodwork.—This may be treated thus: Deep green walls, a greenish grey with silver on frieze, a cornice of grey and silver, and the ceiling the same. A good effect is gained by having the upholstery in similar colours, relieved by old rose, the draperies being of grey.

Parlours and Drawing-Rooms.—These may be decorated in lighter tints, but it must be remembered that white is always a very chilly colour, and furniture cannot look well against a very light wall. Here light tints of a warm hue may be indulged in with good effect, if taste is displayed in harmonising the tints, which, when properly done, induce cheerfulness.

Pearl Grey Woodwork.—This may have light blue or pink walls, with a deeper blue or pink frieze, having a cornice of grey or light blue, or pink and silver; a light pearl grey ceiling; grey, buff, silver and light pink or blue upholstery; the draperies being of old rose and old blue.

Picture Galleries.—For the wall covering of a picture gallery, there are but three colours possible—crimson red, dirty green, and chocolate.

Polishing Fancy Woods.—Take of rather thick alcoholic shellac varnish 2 parts, boiled linseed oil 1 part, and shake well together before using. Apply with a rubber, and rub briskly until the varnish is hard and bright.

Polishing Marble.—The two following recipes are recommended as yielding satisfactory results: (1) Take 2 parts of soda, 1 part of pumice-stone, and 1 part of finely powdered chalk; sift these through a fine sieve, and mix them into a paste with water. Rub this well all over the marble, and probably the stains will be removed: then wash with soap and water, and a beautiful bright polish will be produced. (2) Clean with diluted muriatic acid, or warm soap and vinegar; afterwards heat 1 gallon of water, in which dissolve $2\frac{1}{2}$ lb. of potash and 1 lb. of virgin wax, boiling the whole for half an hour; then allow it to cool, when the wax will float on the surface. Put the wax into a mortar and triturate it with a marble pestle, adding soft water to it until it forms a soft paste, which, laid on the marble and rubbed when dry with a woollen rag, gives a good polish.

Predominant Colours.—The predominant colour used in the decoration of a room should always be a good lighting one, not necessarily a tint, for many tolerably dark colours light excellently, but it must be of a nature to absorb as little light as possible. A very pale wall will look as comfortless and inhospitable as a too sombre one will be dismal and oppressive.

Preparation of Walls.—Before commencing to paint anything ornamental upon any wall surface or panel, it must be properly prepared. Of course the house painter will see that the surface of the wall is perfectly smooth and even and the requisite number of coats of colour applied. The last should be what is termed "flatting," that is, the turpentine colour only,

or with a little copal varnish mixed with it, which is more lasting, and gives less heaviness in appearance. The style of ornament must be decided on before giving the workman instructions, and where the various breaks or dividing lines will be, so that he may work his colours to finish in an exact line where the colours meet. It is always well to prepare a sample of colours on a piece of paper as a guide for him to match his colours to. If the wall is to be divided by a dado line, the skirting should be heavy in colour, the dado less heavy, the paper a lighter shade or different tint altogether, and the dividing bands may be of some contrasting colour, so that the painter should lay in three portions of the wall and neatly finish them ready for the ornamentation. The sample spoken of need not necessarily be in colour, although that is best, as some find great difficulty in matching tints, unless they are told exactly the combination of pigments of which the colour is composed. It is also well in ground colours to have as few in combination as possible. Often a poor colour is lost by trying to overdo it, and such overdoing results in muddiness of tint; not that we would recommend light gaudy colours, but tones rather subdued, and leave the brighter for smaller forms in the decoration. We feel it necessary to be explicit in this matter, as the slightest change or deviation from the originally proposed tint (which, of course, will have been well studied with regard to aspect of room, light, furniture, etc.) would destroy the harmony of the whole. For example, citron is best made with Antwerp blue and orange chrome, and if wanted slightly warmer, a touch of crimson lake is added. Now, if a pattern of such citron were given to a man, who looking at it thought he would produce it with ultramarine or even Prussian blue, he would most certainly fail, and in all probability would think, should he desire to make it warmer, a little vermilion might be added, but the colour would thus be totally spoiled; we say this because when artists and architects

make coloured sketches of decorations, they should make known to the actual workers of what their combinations are composed.

Preparing Stencils.—The best material for paper stencils is a heavy manila paper. A day or two before using it, it should be tacked up somewhere, and given a good wash or two of linseed oil. This renders it of the requisite pliability. In cutting the design the edges should be laid on a sheet of glass to insure sharpness and evenness, a very sharp knife being used.

Prussian Blue.—The best Prussian blue, when in the lump and dry, has a bronze appearance that cannot be mistaken. Prussian blues which are adulterated, on the other hand, even to a small extent, do not possess this characteristic appearance.

Relief Work on Walls.—Paper pulp, glue, linseed oil, and carbonate of lime or whiting, provide an excellent material for moulding of relief work on walls. The designs are attached with glue, and admit of either oil or water painting.

Removing Spots from Varnished Goods.—It depends entirely upon the nature of the substance which caused the stain. In the absence of any specific knowledge we give the following formula: Make a mixture of equal parts of linseed oil, alcohol, and turpentine; slightly moisten a rag with it, and rub the spots until they disappear. Then polish the spots with ordinary blotting-paper. Varnish injured by heat can hardly be restored in any other way than by removing it altogether and applying a fresh coat.

Rosewood.—Rosewood does not, as many suppose, take its name from its colour, but from the fact that when

it is first cut it gives forth a perfume similar to that of the rose, and although the dried rosewood of commerce retains no trace of this early perfume, the name is still retained.

Rosewood Finish.—To produce a rosewood, stain the wood with dilute nitric acid, grain with burnt amber, and glaze with carmine or lake.

Satinwood.—The ground for satinwood is composed of white lead tinted with raw sienna. The graining colour should be raw sienna and Vandyke brown, ground in water or beer. The work is to be rubbed in level with a tool and a long hair mottler. Then moisten a rather coarse sponge in beer, and draw it down the work so as to leave it in rather broad streaks, running in a slightly wavy or oblique direction, and then soften the work with a badger blender. Then with a moist camel hair mottler mark down the edges of the streaks with a jerky motion, so as to give it a varied appearance. For the overgraining colour use Vandyke brown mixed with beer; the hearts and growths being put in with a small sable pencil, and blended with a bristle brush, the same as for walnut. The rest of the overgraining is done with a piped overgrainer. The work must receive two coats of varnish.

Selection of Natural Forms for Decoration.—In the many varieties of the well-known Scottish plant, the thistle, the decorator is furnished with very useful material for his work—material which has hardly been used to the extent it deserves. The whole plant is highly decorative: its upright growth, its spiky leaves, so full of character and crispness, in all its varieties, as well as its shapely and numerous flowers, altogether afford plenty of opportunity for a spirited play of line and light and shade. Like the sunflower, iris, and ox-

eye daisy, it is only to be suitably represented in a perpendicular position. The leaves of this plant are especially suitable, and would look well in wood carving. The most suitable plants to be used for patterns which are required to go "all over" a surface, are, of course, the climbing and creeping ones, which are so numerous in garden and hedgerow. Plants of a more fixed and decided growth are not always inadmissible, although they are naturally more difficult to manage with good effect, especially when it is desired to construct the pattern simply, with only one kind of growth. In the first rank of beauty and usefulness comes the honeysuckle. All the varieties of this lovely plant are equally beautiful, from the wild woodbine, climbing and twisting inextricably around the bramble or other undergrowth in the woods, to the cultured but unspoiled garden beauty, ornamenting with its fleshy dark green leaves, its clinging rose-coloured stem, its exquisitely shaped and tinted groups of flowers, and its brilliant crimson berries. The French and Japanese honeysuckles, with their pure white flowers growing always in pairs, are also equally beautiful to the designer of trailing patterns. The honeysuckle, too, has the advantage of mixing well with almost any other plant of a more stiff and rigid growth which the artist may desire to use for covering a wall or other surface. Such a plant as the rose, for instance, having a fine flower but being somewhat unmanageable because of its straight and angular growth of stem, may be rendered graceful and satisfactory by having the honeysuckle or some other twining plant twisting and twining about it. The individual flowers, or groups of flowers, of the honeysuckle are not so useful as separate objects for tiles as many other flowers, the chief beauty of the plant consisting in its graceful clinging and wandering character as a whole. Of a totally different character from the honeysuckle, the jasmine is another example of a thoroughly useful plant for decorative treatment. If used alone it is perhaps superior to

its softer and more clinging rival. Very satisfactory designs, in one or two colours, and small in scale, may be produced from this plant. The fair five-petalled flowers in variously numbered clusters, and the elongated spearhead-shaped leaves, five or seven in each group, lend themselves very kindly for simple ornamental treatment. Owing perhaps to its marked and somewhat angular character, the jasmine is a more difficult plant to mix kindly with others in a design than the honeysuckle. The jasmine flower has often been used for the purpose, and it is always good; it has, however, one drawback. The flower never looks well except when viewed full in the face; the flower is so flat and the pistil protrudes so much, that a perspective view of the flower is unpleasant. It is owing to the blossom having always to be drawn thus perfectly circular and flat, like so many medals or coins, that a design from the passion-flower appears invariably somewhat conventional. This may by some persons be considered an advantage; that is, of course, a matter of individual taste. The foliage, leaves, and buds of the passion-flower are shapely, and there is not any difficulty in arranging them with good effect. The tendrils, too, by which the plant clings to any support it can lay hold of, may be made a good feature in the design. Like the sunflower and the wild rose, the individual blossoms of the passion-flower afford a good object with which to decorate a small painted panel or tile; but, owing to the protuberance of the pistil before mentioned, it is unsuitable for carving. The best and most spirited examples of good treatment of natural forms are perhaps to be found among the art works of the Japanese.

Silver Birch Woodwork.—This may have dark chamois and silver walls, with a sea-green frieze; chamois, sea-green, and silver cornice; chamois ceiling; chamois, ochre, silver, and green upholstery; and draperies of pale green with pink.

Silvering Glass.—The reducing process is thus: Dissolve 12 grs. of Rochelle salts in 12 oz. of water, and boil; then add, while boiling, 16 grs. of nitrate of silver dissolved in 1 oz. of water, and continue boiling for ten minutes, after which add sufficient to make 12 oz. For the silvering process dissolve 1 oz. of nitrate of silver in 10 oz. of water; then add liquid ammonia until the brown precipitate is nearly but not quite all dissolved; then add 1 oz. of alcohol and sufficient water to make 12 oz. Distilled water should be used in making these solutions. When both preparations are ready, take equal parts of both solutions and mix them thoroughly; then lay the glass face down on the top of the mixture while still wet, the glass being carefully cleaned with soda and well rinsed with clean water. About 2 drs. of each solution will be sufficient to silver a plate 2 in. square. The dish in which the silvering is done should only be a little larger than the plate. It is better to let the solution stand and settle two or three days before being used.

Spots.—As a rule spots on painted work are due to one of two causes, viz. poor timber, or too thin a coat of paint. The latter fault includes an improperly prepared ground in priming. It cannot too often be pointed out that no good work in painting is possible if the priming coat is faulty.

Staining.—Ordinary plain staining can be done by almost any one who can handle a common paint brush. Yet it is not generally known, even to skilled decorators, that stains on sound white wood, evenly planed, can be applied to imitate the most intricate of artistic designs; such, however, is the case. A decorator, if asked to imitate in stain on white wood, a piece of parquetry, or inlaid wood, might reply that such a thing was impossible, alleging as a reason that by employing liquid stain in the same way as a distemper—that is to say, by the aid of a

stencil to reproduce the pattern—the stain, as soon as it became absorbed, would be found to "run," and so giving to the pattern imitated an indistinct or blurred edge. Yet the most elaborate patterns are successfully stencilled direct on to deal and pine, and the figured work on such woods has invariably come out as distinctly and naturally as to be almost indistinguishable from the inlaid woodwork they have so successfully sought to imitate. The great difficulty to be overcome in stencilling with stains is undoubtedly the "running," but with a very little care and patience this can easily be obviated. Say a painter has a border to stain round an ordinary pine floor in imitation of a selected pattern in parquetry, the colours of which are generally in two or more shades of oak, the first thing he has to do after having properly prepared the floor—namely, making the part to be stained as smooth and even as possible by filling up the crevices and nail holes—is to stain over the work in the lightest shade shown in his pattern, and this can be done by diluting the ordinary liquid oak stain with water to the desired tint. Next let him cut out of a piece of lining paper in the form of a stencil, the pattern he has to reproduce on the floor, care being taken to cut the stencil clear and sharp, and to afterwards apply a coat of linseed oil to the stencil in order to strengthen and preserve it. He should then mix the stain into a stiff paste, or to the consistency of a distemper used for ordinary stencilling; place a portion of this mixture on a smooth piece of wood, taking up a very small quantity of it on a stencil brush, and apply through the stencil plate in the same way as he would a distemper. If a very dark shade is required, apply more stain before removing the stencil plate.

Staining Yellow Brown and Red Brown.—A solution of 50 parts of commercial alizarine to 1000 parts of water, to which solution of ammonia has been added, drop by drop,

until a perceptible ammonia odour is developed, will give to fir and oak a yellow brown colour, and to maple a red brown. If the wood is then treated to a 1 per cent. aqueous barium chloride solution, the first named becomes brown and the latter a dark brown. If calcium chloride be used instead of barium chloride, the fir becomes brown, the oak red brown, and the maple a dark brown. If a 2 per cent. aqueous solution of magnesium sulphate be used, the fir and oak become dark brown and the maple a dark violet brown. Alum and aluminium sulphate produce on fir a light red and on oak and maple a blood red. Chrome alum colours maple and fir reddish brown and oak a havana brown; manganese sulphate renders fir and maple a beautiful dark violet brown and oak a dark walnut brown.

Stencilling with Distemper Paints.—To have a colour in distemper work sharp, and one that will not spread, mix as much colour as is required in a stiff paste with linseed oil. When well mixed or ground, lay the colour on a heavy coarse brown paper for an hour or more. This will absorb the fatty and sticky portion of the oil, and prevent any danger of spreading. It may then be thinned with turpentine to the proper consistency.

The Relation of the Floor to Walls and Ceiling in Decoration.—It has sometimes been laid down as a law that the colours in a room ought to ascend from dark to light, just as in nature, in which we also find the ground to be the darkest, while light is represented by the sky. There is some truth in this, though the comparison is a lame one, as the closed room is not the open air, but its very opposite. The proposed scale of tones ascending from dark to light causes the room to appear more free and airy, and makes the ceiling, or that which by its weight presses downwards, appear lighter. But it would be a great mistake to raise this sequence to the dignity of a law.

Such a gradation is not necessary, nor have the good and genuine styles of art ever troubled themselves much about it. Nay, they have even not unfrequently selected the ceiling above all other places for the richest decorative display, and have thus made it not light and airy, but, on the contrary, rather heavy and weighty. In Pompeian wall decoration, black is not only the colour of the dado, but also of the frieze, and sometimes even of the whole wall. It would be much easier to establish the proposition that where floor, wall, and ceiling differ in colour, an equal strength of their tones (or, in other words, the same proportion of light and of dark colour) would be necessary to produce harmony. But even this proposition cannot be absolutely accepted. One thing, however, may be reasonably affirmed, namely, that the floor should not be kept too light. It is not only unpleasant in itself to have the light thrown into the eye from below upward by a broad surface of considerable brightness, but it must also be considered that the floor is the foundation upon which the whole decoration rests. Consequently, if it is to produce the impression of repose and security, it must be neither too rich nor too gaudy nor too light; for as that which is light in colour corresponds to that which is light in form, so does that which is dark in colour correspond to that which is solid. For this reason we should prefer among our modern parquetry floors those of dark wood to those in which white is used (and indeed with dark walls such floors become a necessity), and in carpets limit the use of whites and greys as much as possible, altogether discarding those which are wholly grey or greyish white. Harsh and striking contrasts of colour upon the floor should be avoided; for it is fitting that that which is upon the ground should attract the eye and occupy the attention. The floor must not be neglected; it must play its part in the general harmony of colours (for this will not bear to have anything overlooked), but it must do so quietly and unobtrusively.

Transfers.—A sufficiently serviceable copy of a printed outlined decorative design may be obtained by damping a somewhat absorbent paper with a weak solution of acetate of iron, placing this on the print, and pressing the two together in a copying press. Should the design abound in detail, dampen unsized paper with a weak solution of sulphate of iron mixed with sugar water, and proceed as before.

Transparent and Brilliant Varnish.—A permanently transparent and brilliant varnish can be made by dissolving 10 parts of clear grains of mastic, 5 parts of camphor, 5 parts of sandarach, and 5 parts of elemi in a sufficient quantity of alcohol, and apply without heat.

Varnish.—Varnish must only be poured into clean vessels, and from these never back into the stationary vessels if it has been in contact with the brush. Use only dry brushes for varnishing, which are not moist with oil of turpentine or linseed oil or varnish. Apply varnishes of all kinds as uniformly as possible; spread them out evenly on the surfaces so that they form neither too thick nor too thin a layer. If the varnish is put on too thin the coating shows no gloss; if applied too thick, it does not get even, and does not form a smooth surface but a wavy one. It is very risky to use the bottom of a can of varnish for a particular piece of work, as varnish has a tendency to deposit a sediment after long standing. Brittleness is an inherent defect in varnish, which is caused either by an excess of drier or lack of oil in the composition of the varnish, or by the employment of adulterated materials. In varnishing, if a brush with loose hairs be used, it will not fail to give plenty of trouble. Even after the hairs have been removed from the fresh varnish, the traces left are scarcely less unsightly. Varnish is without question the most delicate of the many materials with which the painter has to

deal. It can only be properly applied under favourable conditions. Ventilation and uniform heat are absolutely necessary in order to produce good results. A piece of varnished work executed in a room very hot from many gas jets will be certain to go wrong when the gas is turned out and the temperature is considerably lowered. Varnish will flake from colour that has not had time to dry, and has a gloss; or rather it will crawl off in the first place, and then chip off later. Varnish, however, when properly compounded and put into clean vessels, should produce clean work under proper conditions.

Varnish Stain.—Being transparent, sienna mixes well with pale varnish and makes a good varnish stain.

Venetian Red Paint.—A gallon of paint made of finely ground Venetian red mixed in oil will cover one-fourth more, and do it better, than a gallon of paint made of dry Venetian red mixed in oil. It will take much less time to put it on, will wear out fewer brushes, will wear longer, and hold its colour better.

Waterproof Varnish.—This formula for varnish is well adapted for the protection of prints on glass against humidity; moreover, it keeps well. White gum lac, 27 to 32 parts; borax, 8 parts; carbonate of soda, 2 parts; glycerine, 1 to 2 parts; water, 320 parts. Dissolve the borax and the carbonate of soda in 160 parts of warm water, and place in the solution the gum lac, which has been broken into small fragments. Place on the fire the vessel containing the mixture, and agitate until the lac is dissolved. Allow to cool, filter, and afterwards add the glycerine and the quantity of water necessary to complete the 320 parts. At the end of a few hours a deposit is formed; after filtration the liquid should have an amber yellow colour.

Wax Finish.—Mix together, with heat, white wax and spirits of turpentine to the consistency of thick paste; when cold apply it to the work with a rag; rub on heavily, so as to fill the pores of the wood; remove the wax from the surface with a wooden scraper made in the shape of a carpenter's chisel; smooth off with a bunch of soft rags by rubbing hard and quick for a few moments; finish with a little French polish applied with a pad. For table tops and all large flat surfaces allow the wax to remain on, and finish with a warm iron by passing it lightly and quickly over the work until the wax is made smooth and the surface is sufficiently polished. This is not considered a desirable finish, as it is not durable, and water spoils it very easily.

Wax Finish for Wood.—One of the most satisfactory wax finishes for wood is made by boiling $\frac{1}{4}$ lb. of white wax with 1 oz. of pearlash and 1 quart of water. It is to be stirred while boiling, the stirring being afterwards continued till cold. The composition is to be applied with a paint brush, after which the surface is rubbed until dry with velvet plush.

White Cabinetmaker's Polish.—This is made by dissolving 10 parts of perfectly bleached shellac in 45 to 50 parts of spirits of wine. This colourless varnish may be used for light woods, such as maple, ash, boxwood, etc., and is also employed by turners to give a beautiful glossy appearance to their work. A mahogany polish is made by mixing $17\frac{1}{2}$ oz. best shellac with 34 oz. of strongest (96 per cent.) alcohol, melting the resin by means of a uniform heat, as given by a water-bath. A dark polish may be made by dissolving $10\frac{1}{2}$ oz. ruby shellac and 2 oz. of Venetian turpentine in nearly $4\frac{1}{2}$ lb. of strongest alcohol, and filtering through blotting-paper.

Whitewash.—A good durable whitewash is made as follows: Take $\frac{1}{2}$ a bushel of freshly burnt lime, slake it with

boiling water, cover it in the process to keep in the steam. Strain the liquid through a fine sieve and add to it 7 lb. of salt, previously well dissolved in warm water; 3 lb. of ground rice, boiled to a thin paste and stirred in boiling hot; ½ lb. of powdered Spanish whiting; 1 lb. of clean glue, which has been previously dissolved by soaking it well, and then hanging it over a slow fire in a small kettle within a large one filled with water. Add 5 gallons of hot water to the mixture, stir it well, and let it stand a few days, covered to protect it from dust. It must be put on quite hot. About a pint of this mixture will cover a square yard, and it answers equally well for wood, iron, or stone.

Yellow Lake.—Yellow lake, as well as Dutch pink and gamboge, may be safely mixed with all pigments but Naples yellow, but will not add to their stability.

Yellow Ochre.—Yellow ochre being comparatively speaking acid proof, it will mix with any vehicle, such as japan, oil, water, or other binders, so that it suits the fresco painter as well as the house and carriage painter.

Yellow Orange Woodwork.—This may have yellow lemon walls, with a yellow orange frieze; lemon yellow and gold cornice; light lemon yellow ceiling; with the upholstery of yellow orange, cardinal reds, warm browns, and a little olive or blue; the draperies being of blue and russet brown.

Yellow Stain.—Wash over with a hot concentrated solution of picric acid, and when dry polish the wood.

Yellow Varnish.—Take 1 quart of spirits and put it to 8 oz. of sandarach; shake it half an hour; the next day it will be fit for use; strain it first; take lamp-black and put in your

varnish about the thickness of a pancake; mix it well, but do not stir it too fast; then do it eight times over and let it stand quite still the next day; then take some burnt ivory, oil of turpentine, as fine as butter; mix it with some of your varnish, till you have varnished it fit for polishing; polish it with tripoli in fine flour; lay it on the wood smooth with one of the brushes, then let it dry, and do so eight times at least. When very dry lay on your varnish that is mixed, and when that is dry, polish it with a wet cloth dipped in tripoli, and rub it as hard as you would platters.

Zinc Painting.—In case any of my readers may be called on to paint zinc, the following is the matter of preparing the metal for the reception of the paint. Take one part of chloride of copper, the same of nitrate of copper, sal ammoniac, and commercial hydrochloric acid, which dissolve in 64 parts of water. Apply with a brush and leave for 24 hours, when it will be ready for painting on.

PAINTING

Adulteration of Paints.—To follow these exercises it will be necessary to possess some slight knowledge of chemistry and some of the materials used by chemists; but any intelligent person can, by careful reading of these descriptions, test substances qualitatively (which will be sufficient for most persons) without the aid of expensive apparatus or external assistance of any kind. For quantitative analysis a delicate chemical balance will, of course, be required. We take paints first. White lead is now very seldom sold in the dry state, but samples are occasionally met with. Its covering power being superior to that of any other known paint, it is very largely used; and it is frequently adulterated with substances of inferior quality. The most common adulterants are sulphate of baryta and chalk. QUALITATIVE ANALYSIS.—1. *Sulphate of Baryta.*—Treat a small quantity with dilute nitric acid, and heat on the sand-bath. If any insoluble remains, it is either sulphate of baryta or insoluble silicates. Filter, take a portion of the insoluble on a piece of clean platinum wire moistened with hydrochloric acid, and test at the blowpipe. If the flame be coloured green, the precipitate is sulphate of baryta. By moistening the wire in hydrochloric acid the green colour is reproduced many times. 2. *Insoluble Silicates.*—If no green colour appears, the insoluble is a silicate. This may be proved by forming a bead with microcosmic salt on a loop at the end of the platinum wire, and taking some of the precipitate on this bead, fusing it again in the blowpipe flame. If small infusible

particles whirl around within the bead while in the flame, the presence of silicates in the precipitate may be inferred. 3. *Chalk.*—The presence of chalk can only be ascertained after separating the lead. This is best done by adding ammonia solution to the nitric acid solution until alkaline, then sulphate of ammonia in excess, and boiling for five minutes. Filter off the black precipitate which is formed, and to the filtrate, first tested with an additional drop or two of sulphate of ammonia to insure the removal of the whole of the lead, add ammoniac oxalate. If a white precipitate appear, it is calcic oxalate. Test a portion of this precipitate at the blowpipe. A brick-red colour imparted to the flame verifies the presence of chalk. 4. *White Lead.*—The presence of lead should be ascertained. This is indicated by the black precipitate given with sulphate of ammonia. It may be best ascertained by boiling the nitric acid solution to expel the free nitric acid, adding dilute sulphuric acid to the clear solution, dissolving the white precipitate of sulphate of lead thus formed in ammoniac acetate, and adding potassic chromate to this solution. A heavy yellow precipitate (chromate of lead) forms when lead is present. QUANTITATIVE ANALYSIS.—5. *Insoluble Substances—Sulphate of Baryta and Silicates.*—Take 20 grs. of the sample; treat with dilute nitric acid as above. The quantity taken for analysis may be weighed in a watch-glass or a small basin; but should be transferred to a beaker, and the glass or basin washed with distilled water before the acid is added. If this precaution be not taken, and the acid added directly to the watch-glass or basin, to be washed into the beaker afterwards, the violent effervescence which takes place on the addition of the acid will occasion considerable loss by spurting. If, after heating with nitric acid, an insoluble remains, a few crystals of chlorate of potash may be added to the boiling liquid to insure the solution of all soluble substances. The boiling is continued for a few minutes, then cold water is added, and

the whole passed through a filter. The insoluble on the filter is washed with hot water until the water leaving the filter is no longer acid to litmus paper. It is then dried on the water-bath, ignited, and weighed. Test at blowpipe as before. Sulphate of baryta and silicates, if both present, are not usually separated. 6. *Weighing Precipitates.*—This general direction applies to almost all precipitates. If strong acids or acid and chlorate of potash are used, the liquid should invariably be diluted before filtering. In washing, allow the whole of the wash water to drop from the filter before adding more water. When thoroughly washed, fold the filter paper flat in the funnel, or, better, transfer the filter paper and its contents to a large watch-glass or flat basin, and dry on a water-bath. When dry, carefully unfold the filter over a quarto sheet of staff glazed paper; with a feather brush off every particle of the precipitate adhering to the filter paper; collect the precipitate on the glazed paper, again using the feather, and cover over the precipitate with the funnel. Fold the filter paper till it assumes the appearance of a solid cylinder about one inch in length, and ignite with the Bunsen burner over a weighed platinum or porcelain capsule. After a while the filter paper becomes a charred mass of smaller dimensions, and drops from the wire into the capsule. The wire is cleaned into the capsule, by means of the feather, of any adhering particles, the charred paper is crushed with a glass rod, and ignited over a Bunsen until the ash is no longer black. The capsule is then stood on a porcelain slab, and the precipitate carefully transferred from the glazed paper into the capsule, the feather being employed to remove the last traces. The capsule is then ignited over an Argand burner until the weight is constant. The filter paper must always be ignited before the bulk of the precipitate is transferred to the capsule. 7. *White Lead.*—The nitric acid solution obtained above is boiled nearly to dryness, and if a precipitate forms a little water is added, then dilute sulphuric acid in small quantity, and the

boiling continued for some minutes to expel the last trace of nitric acid. An excess of sulphuric acid is then added to precipitate the whole of the lead and lime as sulphates, which appear as a white heavy powder. The beaker and its contents are then cooled by immersion in cold water. When cool, double the bulk of alcohol is added, and the whole allowed to stand for some time—overnight if possible. It is then filtered and washed with alcohol until the washings are no longer acid; dried, ignited in a porcelain capsule, and weighed as above. From the weight obtained deduct ·05 gr., the amount of ash contained in an ordinary Swedish filter paper, the remainder multiplied by five for the percentage of sulphate of lead, and (if no chalk is present) this again by ·8525 for the percentage of white lead. If the sample contains chalk, the percentage of white lead must not be estimated until the percentage of chalk is determined (see below). The percentage of chalk is converted into its equivalent of sulphate of lime. This latter deducted from the percentage of sulphates of lead and lime, and the remainder multiplied by ·8525 for the percentage of white lead. 8. *Chalk.*—The readiest way to estimate chalk is to divide the nitric acid solution obtained above into two equal parts; in one estimate the lead as above (multiplying the weight found by ten instead of five), and in the other estimate the chalk. The lead is removed with ammoniac sulphide in the manner described above; to the clear filtrate, ammoniac oxalate is added; if chalk is present, a white precipitate of calcic oxalate is produced. This precipitate is assisted in its separation by boiling; then collected on a filter, washed with hot water, dried and weighed. The ignition is complete when the contents of the capsule assume a tinge of grey colour. The weight obtained after deducting ·05 gr. of filter ash is multiplied by ten for the percentage of chalk. In inexperienced hands it will be better to ignite strongly and weigh as lime, multiplying by ten for percentage of lime and by

1·7857 for percentage of chalk. This chalk may be converted into sulphate of lime by multiplying by 1·36, and the product deducted from the percentage of lead and lime obtained above, prior to calculating the percentage of white lead. The chalk precipitate should be tested at the blowpipe for its characteristic brick-red flame. 9. Some analysts treat the mixed precipitate of sulphate of lead and calcium with concentrated solution of ammoniac acetate, and weigh the insoluble as chalk. This method is unreliable. 10. The oil must first be burnt off, and the ignition continued until no black carbonaceous matter remains. It must be ignited in a porcelain basin over an Argand, turned low at first and gradually raised. The ignition must be completed over a Bunsen. Much time is saved and the analysis rendered more accurate by spreading the mixed paint in a thin layer over the bottom of the basin; and when the ignition is nearly complete, by crushing the scaly crust with a glass rod, carefully remove the adhering pieces on the glass rod by means of a feather. The difference in weight before and after ignition represents the oil plus loss by reductions of white lead to metallic lead. The residue is washed into a beaker with water as before, and afterwards with nitric acid. The metallic lead, which adheres strongly to the bottom of the basin, must be rubbed vigorously with the end of a glass rod until entirely removed. This requires a little patience, but it yields to persistent rubbing. The remainder of the process is the same as in the case of dry white lead.

Art Hints to Sign Writers.—(1) When ornaments or letters are on a ground of contrasting colour, the latter should be separated from the ground by an edging of lighter colour, *i.e.* a red letter on a green ground should have an edging of a lighter red. (2) When lettering or ornaments in a colour are on a gold ground, they should be separated from the ground by

an edging of a darker colour. (3) Gold ornaments or letters on any coloured ground should be outlined with black. (4) Ornaments or letters of any other colour may be separated from grounds of any other colour by edgings of black, white, or gold. (5) Ornaments or letters in any colour, or in gold, may be used on white or black grounds without outline or edging. The ground here is supposed to be of a uniform colour, but if the ground is marbled or grained, an edging will be still required. (6) In self tints, tones, or shades of the same colour, a light tint on a dark gronnd may be used without outline; but a dark ornament or lettering on a light ground requires to be outlined with a still darker tint.

Bad Brushes.—Bad painting is often a matter of bad brushes—brushes that have not been taken care of properly. Twisted bristles and misshaped ends will make the paint cover improperly, and always deface the surface with brush marks. If a brush has become shrunken from any cause, then measures must be taken to overcome the shrinkage before using it. A few days in a moderately damp place, or a little water put in brush-head, will generally remedy the evil. But do not wet the bristles down; keep them in their ordinary condition.

Badger Brushes.—Badger tools are of various sizes, and the hair, instead of coming to a close end or point as in other brushes, diverges or spreads out after the manner of a dusting brush. When good, the hair is long, light, and pliant, of a reddish brown or black, with clean white ends. The chief use of the badger tool is to soften or sweeten broad tints. It is a very valuable assistant to the young painter, but must be used with caution, because its injudicious use frequently destroys forms and produces woolliness. If the badger tool be much employed on a large surface of colour, the points of the hair frequently become so loaded with colour that it is necessary

to clean it often. This is best done by pinching up the brush rather tightly at the ends, and wiping it on a clean rag. The brush is thus kept free from colour during the progress of the work, which might otherwise be sullied and deteriorated in the purity of its tones.

Blistering of Paint.—In the following lines we shall lay down some general rules that govern this phenomenon, and from the same draw some practical conclusions, the object of which will be to set the question at rest. The blistering of paint is in a large measure traceable to the position of the surface—it is usually found on work presenting a south aspect, or exposed to the full rays of the sun. As a defect it is associated with the summer season, winters being opposed to its action. The deduction to be drawn from this is that it is the effect of heat. Paint is a body both mineral and metallic, made into a plastic condition by oil, the object of which is to keep out the moisture from exposed surfaces in our buildings and other works, and to offer on internal works a uniform and pleasing surface to the eye. The oil used is linseed, which by boiling attains setting or drying qualities and becomes better by keeping; its thick or heavy nature when loaded with mineral and metallic matters being let down for temporary working purposes by spirits of turpentine, a volatile spirit that is a mere aid to the spreading of paint. Paint so largely composed of oil will never fairly set or assume a dry state. However dry and brittle it may appear, it is capable of being rendered soft and plastic by the application of heat, and hence the hand stove of the painters is the most ordinary instrument for the removal of old paint. We mention this, for it is clear that, approach the subject as we will, we find heat the prime cause of the blistering of paint. Closing in with our subject, and bringing it into narrower lines, we find blistering, properly speaking, wholly confined to wood as a base or groundwork. It is true it is not

unknown to iron or plaster; but in these cases it is variant in form, and not blistering in the true sense of the term. The blistering of paint on iron is not traceable to the softening of the paint, and the shelling up of the same, but to water making its way to the naked iron through some crack or defect in the paint, and becoming an active agent in oxidisation. The blister thus formed is clearly the separation of the film of paint from the iron by the formation of rust upon the face, which, as a foreign material, forms an effectual separation of the two bodies. The extension of these blisters is dependent upon the supply of water, and, unlike the true blister, is not dependent upon heat or a south or sunny aspect. The blistering of paint on iron occurs in any aspect or position; in the full light or in the dark, in the summer or the winter, the destructive agent being water; it is dependent upon no other conditions. The blistering of paint upon plaster is in a large degree analogous to that of iron, inasmuch as it is formed by the disintegration of the base by the action of water. Painted plaster-work, so long as water can be kept from percolating through the cracks or faults, or gaining entrance from above by filtration, or from below by capillary action, is a highly durable material; but the moment water gains a footing the lime in some degree is dissolved, and, upon being removed and redeposited, undergoes the process of recrystallisation; a powdery substance is thus formed that comes as a stranger between the paint and the plaster, in which respect it bears a strong resemblance to rust, the result of the oxidisation of iron. Large faces of plaster are subject to fractures from expansion under the heat of the sun, or from the lifting of the upper members of a building, consequent upon the admission of water from gutters or copings, the lifting being the result of secondary crystallisation set up in the joints of mortar. We thus get an explanation of the fact that the blistering of paint, so to speak, always occurs in the neighbourhood of cracks or fractures in the plaster, and is more

pronounced in the cornice or upper part than in any other part of a building. In proof of its being the result of crystallisation, the face of the plaster is always found to be covered over with powdered lime. The painter, finding this, takes care to saturate the disintegrated face of the framework in effecting repairs; but this, as he finds to his chagrin, is no protection against a recurrence of the evil, for so long as water or moisture is admitted at any point, so long will this abnormal blistering ensue. The blistering of paint upon plaster work, like that upon iron, is not dependent upon heat; it is a chemical action set up by water upon a body of dry lime in a partial state of crystallisation; it is caused by the lime dissolving, and its removal—it may be but in an infinitesimal degree—and its recrystallisation. Upon the water evaporating, the result is a dry powder that works an effectual separation between the film of paint and the groundwork of plaster, and it does not attach itself to either of the bodies, but remains a powder until the film of paint or blister is removed, when it may be dusted off with a brush. The blistering of paint upon wood is distinct in its order, and is the general blister known in the trade. It occurs on the face of the woodwork exposed to the sun, and is traceable to the influence of heat. It is not pronounced in the case of new work, where the body of paint is not great; but it is a great evil and an eyesore on old work, where the coats of paint are layered one on the other. Wood, as a groundwork, is a porous body highly charged with moisture in a natural state, and never free from it in a so-called dry state when used in exposed situations. It may be taken that wood, during the winter season, or one-half of the year, is absorbing moisture. We may see this in our outer doors, our gates, our sliding sashes, and our shutters; for the joiner is constantly being called into requisition to ease the same. This moisture, so largely present in the atmosphere, cannot be kept out of the wood by the most careful painting. In our shop fronts it has

ready access to the back of the woodwork, the face sides being the only ones which are painted; in our doors and gates it is absorbed from the sills or the ground, from the fact that the lower edges are unpainted. There is always some portion of the woodwork hidden from the eye which is unpainted, and there the system of absorption is active during the winter or rainy season. Wood in this state during the hottest days in summer will make efforts to throw off this moisture. We then find the heat of the sun applied with great force to the painted face, and the unpainted face to be in the cold shade. The effect of this powerful heat is to draw the moisture to the face of the wood, where its course is arrested by the sundry impervious coats of paint; it is here generated into steam, the expansive power of which forces away the paint, and the familiar blister is formed. Paint, as a mineral or metallic body, does not incorporate with the wood—it simply adheres thereto, forcing its fronds, so to speak, in the pores of the wood, and filling up the interstices formed by the bundles of fibres. Hence we find that paint fails to adhere to highly resinous or greasy woods, and the knots themselves, from being hard and compact, must be faced with knotting composition as a ground for the paint.

Brushes.—The first week a paint brush is used, it is better to fill it full of paint and lay it on a board over-night, instead of putting it in water. Whether water, oil, or varnish is used in the brush-keeper, never put brushes in so that they rest on their points. Suspend them so that the bristles are covered up to the binding, not above. Brushes that have become so dry that the bristles have loosened and will not soak up tight after being placed in paint, can be made tight and secure by being squeezed in a vice just across the wire fastening. This clamps the wire a little tighter, and necessarily closes in on the heft of bristles and tightens them. Varnish brushes kept in varnish

and not often used should be looked after, as the varnish will thicken and spoil the brush. It is better to use oil thinned with turpentine. Keep brushes in a cool place, preferably in one both damp and cool. Both the bristles and the wood of the handle will shrink in a warm dry atmosphere, causing separation in the binding. No new brush should be dipped in the paint and put to work without first being cleaned. By working it with a brisk movement backward and forward through the hand, most of the dust and loose hairs will be taken out. A paint brush, when thus thoroughly dry cleaned, should be placed in water for a few minutes—not long enough to soak or swell it, but only until wet through—and then swung and shaken dry. It is then ready to dip in the paint, and although some of the hairs may still be loose, most of them will come out in the first few minutes' working, and can then easily be picked from the surface. The first thing to do in the care of brushes is to keep the tool, when it is new and not soaking, in a cool place, out of hot rooms and any temperature that would tend to make the wood of the handle shrink. Bad painting is often a matter of bad brushes—brushes that have not been taken care of properly. Twisted bristles and misshapen ends will make the best paint cover poorly, and always deface the surface with brush marks.

Brush Marks in Finishing Coats.—Brush marks that show in the last coats are not always caused by the way the finishing coat is put on, but are often caused by carelessness in putting on the under coats. A painter cannot make a first-class job unless he has a good surface. Many painters suppose that a few brush marks in the filling or colouring will not do any harm, as they can easily be hid. This is a great error, and is more than likely to cause the painter a great deal of trouble. You say you rub every coat of varnish very close. It therefore stands to reason, if they do not come out, that they are in

the colour or filling; very frequently the filling is too thick. Filling should be moderately thin. You should add another coat or two rather than have it laid on too thick. Colour put on too thick will give the same trouble. Each coat of colour should be put on with care, as one coat carelessly put on will cause a great deal of trouble. When varnishing, have confidence, and do not try to rub the varnish smooth, but allow it to flow; use the brush only enough to make it even, letting it have plenty of time to flow out; when your varnish is too thick, thin with turpentine. Good varnishing depends more on the laying on than in the material.

Ceilings.—New ceilings should never be whitened before they are dry, as if they are they will have an unsatisfactory and smeary appearance when finished. If there is any sign of moisture on a ceiling it is not in a proper condition to be whitened.

Cleaning Oil Paint Brushes.—All brushes, after being used, should be carefully cleaned. This is best effected by immersing the hair of the brushes in a little raw linseed oil; the oil should afterwards be washed out with soap and warm water, till the froth which is made by rubbing the brushes on the palm of the hand is perfectly colourless. The brushes should next be rinsed in clean water, and the water pressed out by a clean towel. The hair should then be laid straight and smooth, and each brush restored to its proper shape, by passing it between the finger and thumb, before it is left to dry. Care should be taken not to break the hair by too violent rubbing, as that would render the brushes useless. Many painters use turpentine instead of linseed oil in the cleaning of brushes; it effects the object more quickly, but the only use of turpentine that should be permitted is to rinse the brushes in it slightly when it is required to clean them quickly; but on no account

should they be permitted to remain soaking in turpentine, as this practice is certain to injure the brushes, rendering the hair harsh and intractable, and frequently dissolving the cement by which the hair is held in the socket of the handle.

Colouring Walls.—The best preparation for distemper is a thin flat coat of paint. The wall should at first be sized with a mixture made of soap, alum, and a little glue, tinting the size or paint to colour, if dark colours are to be used, or the wall is rough, as church walls are. The distemper itself should never be put on in more than one coat, as it tends to peel if thick. The glue should be covered with water, allowed to stand overnight, the non-absorbed water poured off, and the glue melted. The colour, made up with pigments and fine whiting or Paris white (or zinc white for very fine work) to a paste, is now mixed with the glue and applied cool. An absorbent wall requires of course a larger quantity of water. If oil be used, the wall should be primed or sized. The first coat ought to be of white lead mixed with plenty of oil, a little japan, and some turpentine. The fourth or last coat should be made flat, well thinned with turpentine, but possess the full colour intended. The surface thus produced will bear cleaning with a damp cloth, although it contains little exposed oil. A wall with a smooth white sand finish, dry and hard, is necessary for colouring, and damp spots should be treated with shellac. For church walls a rough floated surface is best for distemper. Stippling the wall surface is a method sometimes used for fine work, and is done by treating the walls with the butt of the bristles. A solid effect is obtained by the process if a full coat of colour is given first. For wall colours, greys, greenish greys, or deep reds are suitable. Among wall colours recommended are a solid red, not very deep, but rather describable as a full pink, and toned with yellow and blue; a light orange pink, to be used sparingly; a pale golden tint (yellowish brown), a very

difficult colour to hit; a pale copper colour between these two; tints of green, from pure and pale to deepish and grey, always remembering that the purer the paler and the deeper the greyer. These are all tried and artistic colours. Perhaps a terra-cotta red or pink is one of the most useful colours for walls and the dados of dining-rooms and staircases where there is plenty of light. Tints of grey from bluish to greenish tones are suitable, and a salmon colour is effective in a room full of cold light.

Cracking Paint.—The painter should never lose sight of the fact that by putting a coat of paint which dries quickly over one which contains too much oil or varnish, and is in a drying condition, cracking must necessarily result, inasmuch as such cracks are caused by the contraction of the undercoat of paint while in process of drying. When this occurs, nothing can hide the cracks—they can only be removed with pumice-stone.

Distemper Colours for Walls.—If distemper is to be applied to a wall or ceiling which is covered with plaster, some whiting is put into water, where it will be easily broken and diluted if allowed time to soak; it must be completely saturated, and when it has settled the clean water must be poured off. To correct the too great whiteness, and to prevent a yellow cast, grind separately in some water a little indigo or ivory black, and mix with it; then add to the mixture some strong size which has been previously warmed, well stirring the whole till properly mixed. The whole of the distemper must be strained while warm, in order to remove all impurities and thoroughly mix the colour. When this is done, the distemper may be put into a cool place till it is formed into a weak trembling jelly, which is the only proper state in which to apply it to the walls. All size distemper colours which are applied to walls, and which are mixed with whiting, should at all times be worked cold, and of a weak trembling jelly, otherwise it will

be impossible to make good work; and great care should be taken not to have too much body in the colour, for it will certainly crack and fall off in scales, as it is not the strength of the size that causes the work to crack, but the body of colour. There is a great advantage in having a sufficient quantity of size in the first coat of distemper, as it binds hard, and stops the suction of the wall, in consequence of which the next coat, if properly prepared, will not move the first coat, but it will work perfectly free, and when dry the work will have a uniform and solid appearance. This method of whitewashing and colouring walls is far superior to lime, as it works much smoother, and when properly mixed and worked upon a new wall it will not crack and fall off in scales; it also covers better, and after being repeatedly applied for a number of years the walls need no scraping, as the colour easily washes off with a whitewash brush, after they have been well soaked with water.

Distempering.—Whiting and jellied size made into a paste, and then melted to a clear liquid, will turn to a dry yellow unless a little blue or black pigment be added, the mixture being afterwards strained. In applying the wash care should be taken to stop all draughts. The painter should face as far as possible the light, so that his hand and arm should not shadow the end of each stroke. Care must be taken to have no patches requiring to be gone over. If the work is executed in a uniform dark tint inclining to blue, it will then dry white. The moment the job is finished, the outside air should be freely admitted.

Dusters.—Never employ paint or varnish brushes as dusters.

Fatty Turpentine.—This has a positive yellowish look and a sour musty smell, and when dropped on a piece of paper,

it leaves a greasy oily stain, easily distinguishable from that left by fresh and pure turpentine.

Fireproof Paints.—There are three substances which have been found fairly satisfactory. These are tungstate, silicate, and aluminate of soda. The first has met with some use for fireproofing cotton, and gives very good results. Silicate of soda is a cheap material, and may be used for fireproofing a great variety of articles, provided, of course, the presence of water has no injurious or detrimental effect on the article being treated. It may be brushed over wood, and by giving several coatings with weak solutions the silicate may be caused to penetrate a fair distance into the wood, and thus give it a material protection; while, if finally a coating of lime be given, silicate of lime would be formed on the surface and a short distance inwards, which serves as an additional protection. Aluminate of soda is not much used on account of its alkaline properties. One fireproof paint with an aqueous vehicle is made from 40 lb. of finely ground glass, 40 lb. of ground porcelain, 40 lb. of china clay, and 20 lb. of quicklime. These are ground up very finely, and then mixed with 60 lb. liquid silicate of soda and sufficient water to make into a liquid of suitable consistence for application. The proportions given above can be varied if desired, and colouring matters, such as ultramarine, Venetian red, oxide of iron, yellow ochre, sienna, and umber can be added to produce a coloured paint. The paint so made is used with a brush in the ordinary way; it dries in a few hours. Two coats are given. In place of using china clay, asbestos may be employed with good results. Another paint is made from 40 lb. asbestos powder, 10 lb. aluminate of soda, 10 lb. lime, and 30 lb. silicate of soda, to which may be added any desired colouring, and water to make to a working consistence. A better plan of working is to have two solutions, and to use one after the other. No. 1 is a solution

of silicate of soda in water; No. 2 is a mixture of quicklime, colouring matter, and asbestos in about the same proportions as given in the above recipes. The wood or surface is coated with No. 1 and allowed to dry. No. 2 is then applied, and also allowed to dry, when another coat of No. 1 may be given. If paint No. 2 contains some white lead, a better coat is obtained. It is a mistake to use resin, gums, and oils for making fireproof paints; all such paints simply form a surface coating of a more or less combustible character, which has little or no fireproofing character. A good fireproof paint may be made as follows: 70 lb. of zinc white, 39 lb. of air-slaked lime, 50 lb. of white lead, and 10 lb. of sulphate of zinc. Mix the zinc white and lime together and grind in elastic oil, then add 1 gallon 35° water glass, and then the white lead and sulphate of zinc. Stir well. This will make white paint. If a shade is required, add the necessary colour.

Flexible Paint.—The following, as a flexible paint, is said to retain sufficient flexibility to enable a sheet coated with it to be rolled:—Soft soap, 2 oz.; boiling water, 12 oz. Dissolve and work well into usual oil paint.

Fresco Paints.—The following are the colours employed by Professor Hess, the German fresco painter:—White: lime which has either been long kept or rendered less caustic by repeated manipulations and drying. Yellow: raw sienna and all yellow ochres. Red: all burnt ochres, burnt sienna, oxides of iron, and lake-coloured burnt vitriol. Green: terra vert, cobalt green, and chrome green. Blue: ultramarine, pure and fictitious, and cobalt. Brown: burnt and raw umber, and burnt terra vert. Purple: burnt vitriol, cobalt, and lake-coloured burnt vitriol. The following are the most permanent colours, and therefore most valuable to the water-colour painter:—Blues: ultramarine, French ultramarine, cobalt, indigo,

and smalt. Reds: Indian red, light red, Venetian red, scarlet vermilion, carmine, pink madder, rose madder, purple lake, and red orpiment. Yellows: cadmium yellow, gamboge, yellow ochre, Indian yellow, mars yellow, lemon yellow, Roman ochre, brown ochre, mars orange, raw sienna, Indian pink, gall stone, and king's yellow. Purples: purple madder, Indian purple, and burnt carmine. Browns: burnt sienna, brown pink, burnt umber, Vandyke brown, sepia, mars brown, Cologne earth, bistre, and madder brown. Greens: emerald green, olive green, and green oxide of chromium. Blacks: ivory black, blue black, neutral tint, and British ink. Whites: oxide of zinc and Chinese white, and sulphate of barytes or constant white.

Fresh Paint.—All plants should be mixed fresh when used. This makes it better for drying than when it has stood for a time, as the tendency of the mixture of oil and japans is to gather oxygen, and get thick and fatten when allowed to stand for a day or so.

Gold Size.—1 (Oil size). Drying or boiled oil thickened with yellow ochre or calcined red ochre, and carefully reduced to the utmost smoothness by grinding. It is thinned with oil of turpentine. It improves by age. It is used for oil gilding. 2 (Water size). Parchment or isinglass size mixed with finely ground yellow ochre. Used in varnished or distemper gilding.

Graining Colours.—These should always be strained before being used.

Hints about Painting.—There is a class of oils which, when thinly applied, in contact with the air undergo a certain chemical change called "drying." Linseed oil has this drying property in a high degree; hence its value in the

preparation of oil paints. The drying property of the oil is increased by the addition of what are called "driers." They enable the oil to become the more quickly converted into a tough elastic solid; but too much drier causes the paint to peel or blister. Paint properly spread should be in a thin layer, as the paint begins to dry first at the surface. Paint laid on by an unpractised hand may require weeks to dry, whereas if the coat had been properly applied it would have dried in eight or ten hours. Paint too heavily laid on will show the want of skill in the hand that applied it by its "pitted" and wrinkled appearance. The amount of paint required to cover a given surface will vary with the temperature at which it is applied, and will also be modified by the nature and character of the surface to be covered, and whether the surfaces are horizontal or vertical. Lastly, all other conditions being the same, the amount of paint required to cover any given surfaces will vary with the skill of the hand that applies the paint.

Hints on Oils used by Painters.—The longer oil is kept the better, both as regards drying and transparent qualities. To make good nut oil, the skins of ripe walnuts should be peeled off, as it contains an acid which turns it brown. Poppy oil is made from the ripe seed of poppies. It is the best drying oil. The oil of spike, or lavender, is obtained by distilling spike with water; it is very volatile, and fine for working with the pencil, or for enamelling. To make a good drying oil for extra fine painting, take of poppy oil or nut oil 1 pint, of gum sandarach 2 oz., of white vitriol and sugar of lead each 1 oz. Boil the whole till the solid ingredients are dissolved, and the mixture is the colour of linseed oil. This oil will dry fast, and a portion of turpentine added makes a fine oil for use where the purest white tint is required. It may be mixed with other oils as a drier, where common

drying oil would be injurious to the colour. Raw linseed oil for woodwork is the best, as being more volatile than boiled oil; it strikes into the wood, and forms a hard resinous filling.

Items for Grainers.—A good foundation is essential for a good job, so add considerably of lead to the priming coat to give body. A smooth surface is a requisite for a good job at graining. Where the wood is old, sandpaper or lump pumice-stone may be employed, the latter for preference. Never use Indian red in a ground colour; it is not transparent, and will make the work look muddy. The ground colour for old work should be made with half-and-half of oil and turpentine, with just enough driers. For thickening graining colour without alternating the shade, a little boiled whiting is perhaps as good as anything. The best thinner for distemper colours is stale beer, diluted one-half with water, and in cold weather a little alcohol may be added. The colour on new work should be of oil, with a large amount of driers, for first coat; with some turpentine in second and third coats. A good job in graining is impossible unless the very best pigments are used, and the colour should always be strained before thinning. When the operator combs hard on yellow pine, he should not go over it twice, as the grain is straight, and never crosses each other. Blend the work lengthwise. In making groundwork for framing oak, a little raw umber helps to bring it to the colour of the natural wood, but for light oak it is better to omit the umber. Sandpapering between coats adds very much to the finished effect, and the groundwork should always be lightly sandpapered before being rubbed in. Silver maple graining makes a pretty job when well done. The ground is white—slightly creamed—nearly white, and the graining is done with ivory black. It is a mistake to suppose that a worn-out brush is a good thing for rubbing in the colour. Use a good flat brush, not a round one; one

about 3½ inches broad. A good finish for outside grained work in place of varnish, and more durable, is two parts of raw linseed oil to one of japan drier. Rub it well in to the surface. Do not be misled by some other grainer's good work. It may not be true to nature, though possibly very beautiful. Study the natural growth of the wood. Great care should be exercised to avoid brush marks in the foundation, as they are hard to remove, and probably will not be rubbed away.

Lamp-Black.—True genuine lamp-black is of great density of colour, great bulkiness, and produces a bluish grey tint with white lead.

Linseed Oil.—Linseed oil is a fatty, unctuous vegetable oil, and is said to be the most insoluble of all the oils; hence its use for preserving and in painting outside exposed surfaces.

Mixing Tints.—If carmine is added to burnt umber, a chocolate tint is the result. Adding lamp-black and ochre to Venetian red gives brown in different shades, according to the consistency of the mixture. Colouring yellow ochre with Venetian red gives a brick colour. Add lamp-black to white, and a lead colour is the result. If necessary a little Prussian blue may also be added. Tints made with Vandyke brown are not permanent. Turkey umber and drop-black will give much better satisfaction. Bright brick red sometimes used in interior decoration is made by mixing burnt sienna, vermilion, and umber. Drab is a colour that can be largely used in house painting. It should be made warm by the addition of a little red.

Mulder's Drying Oil.—Boil for two hours with 100 parts by weight of linseed oil, 2 or 3 parts of litharge,

or what is better, red lead. Oil boils at 600°. If a clear oil is desired, filter and place in leaden vessels protected by glass from dirt, but exposed to the sun. It should not be forgotten that the process of oil boiling is dangerous, and may cause destructive fires. It is not necessary to boil the oil. Oil heated to 212° with red lead for two hours is a quickly drying oil. Heating the oil alone does not cause it to dry more rapidly, unless it is thinly spread on a surface to which air has access. But with driers which give up oxygen to it, the oil is oxidised, the soft non-drying and free oil acids are made into soaps, and the oil quickly hardened. Boiled oil, with proper driers, not only dries quicker, but it is even probable that we obtain an oil which retains its elasticity longer, and it is thought to stand better in outdoor work. It has, however, a greater tendency than raw oil to darken and change colour, aside from changes of colour in boiling. For iron, it gives immediately a more sticky and thicker covering, and immediately and for a longer time a more elastic oil. It is, however, an unsatisfactory oil to purchase, because it is largely adulterated, especially with resin oil, which produces a perpetual stickiness and tack. Very much boiled oil, so called, has never seen a strong fire, being merely the raw oil thickened with strong driers, or perhaps slightly warmed with them. Properly made, such an oil is not of necessity a bad one.

Notes on Colour.—Decoration should not be pictorial, shaded to imitate work in relief, or represented in perspective. Colours should not represent material, but be considered decorative only. Positive colours should never be used in juxtaposition, or upon each other, but always separated by white, black, or gold. The same colours, in different tones—as light and dark chocolate, called "self tints"—may be used

one upon another. The primary colours, red, blue, and yellow, should always be used sparingly, and in small quantities, as we see in nature, where the secondaries, greens, often toned down by the tertiaries, greys and browns, always predominate. Colours on light grounds appear darker, and on dark grounds lighter, than they really are. If colour be applied to ornaments in relief, the ground should be darker than the ornament. There is an exception to this when gold is used.

Oil Sizes.—One method of making this is to place pure raw linseed oil in a tall glass vial, and hanging the vial or bottle where it can get sun and air in the greatest quantity. Do not cork the vial. This makes a beautiful honey-like substance, but it takes a long time in the making. A quicker way is to add some japan to the raw oil. Or mix dry yellow ochre, 2 parts, to 1 part white lead, dry, and add sufficient raw linseed oil to make it like workable paint. Expose to sun and air. The oil will rise to the top, making fat oil. This requires only a few weeks. Or boil raw oil in a copper or porcelain-lined iron pot, securing a temperature of about 500° Fahr., for three or four hours, and add about 10 per cent. of good liquid drier or good size japan. This makes a thick varnish-like substance that will have to be reduced with turpentine. Do not use benzine, as it will not answer, nor allow a good job over it. A size for gilding upon japanned tin and varnished surfaces is made by taking 1 part elastic body varnish and 2 parts best japan gold size; colour with Naples yellow, and use no turpentine thinners. Stir a little litharge and red lead into some boiled oil; let it stand, shaking frequently until the oil has bleached; then bottle it. Raw oil will give a slower drying size.

Painters' Cream.—This is a preparation employed by painters to cover up work they are obliged to leave unfinished

for a length of time. They cover with it the parts already painted, and it preserves the colours, and can easily be removed when the work is again taken up. It may be made as follows: Take ½ oz. of the best mastic, finely powdered, and dissolve over a gentle fire in 3 oz. of very clear nut oil. Pour the mixture into a marble mortar, with 2 drms. of powdered sugar of lead at the bottom of it. Stir this with a wooden pestle, and keep adding water in small quantities till the whole appears like cream, and refuses to admit more water so as to mix freely.

Painting.—Whenever possible, painters and others should always work on the shady side of a building during hot weather. Painters often are to be found sweltering in the sun when they could as well, and better, be engaged in the cooler shade.

Painting in Relief.—When painting in relief—that is, in one colour with its tints and shades—it will be found a good plan to first lay in the whole design with a medium shade of the colour, which gives an opportunity to lay in the dark shades of that colour, and then the lights with tints of the same colour made by the addition of white.

Painting New Sign Boards.—Brush the board, back and front, with equal quantities of linseed oil, japanner's gold size, and turpentine, to which add a little ground white lead, driving or rubbing out the colour well. For the second coat, take equal quantities of white lead, common spruce ochre, and whiting, all well dried, and ground fine and stiff separately with raw oil; mix the whole together, add sufficient of gold size to cause it to dry quickly, firm, and hard; dilute with turpentine to a proper consistency, and apply two or three coats of the above colour. When dry and hard, rub the surface smooth, either with sandpaper or pumice-stone and water,

then grind equal portions of spruce ochre, whiting, bathbrick, and white lead with 2 parts oil and 1 part turpentine, and apply one, two, or three coats if necessary, taking care to rub down and wash off the paint between each coat, repeating the rubbing and colouring until the surface is as smooth and level as plate glass. It is then fit to receive the required last coat, to write, marble, or grain upon. The finishing application, whether it be a plain ground, landscape, figure, or letters, ought to stand until thoroughly dry and hard. It should finally be varnished twice over with best body copal varnish or amber varnish, as the delicacy of the painting will admit.

Painting Plaster.—The painting of plaster demands a few observations. White lead and linseed oil, with some litharge as a drier, are mixed to the consistency of thin cream. On the application the oil is entirely absorbed into the plaster in a few hours. The coat will be sufficiently dry in a day or two, when another, a little thicker, is given, the oil of which is wholly or in part absorbed, according to the nature of the plaster. In a few days a third coat, rather thick—this thickness being regulated according to the absorption of oil from the last coat, with a quarter or less of turpentine—is added, the pigments being also introduced; but when very durable work is required, a third coat is put on, thinned with even proportions of turpentine and oil, and then the flatting coat. If the plaster be not flatted, the last coat is made of 2 parts to 1 of oil. The surface of the plaster is hardened by the oil, and rendered less brittle, thus admitting of its surface being washed. To effect absorption quickly, the plaster is sometimes given two or three coats of boiling linseed oil, which are soon absorbed, and these are followed by a coat of paint. Carbonate of lead or white lead usually constitutes nine-tenths of the body of the paint. Good quality of this lead is important to durability. Painters have often occasion to complain of the defectiveness of the plaster

they have to work on. Unless the plaster is good the lime works out in minute bubbles and destroys the effect of the painting, which can only be corrected by rubbing down and commencing the work over again. Four coats of paint, using white lead and linseed oil, with a small quantity of driers, are not too much for good work.

Painting Walls with Cement Coating.—No glue sizing should ever touch the cement, as it is apt to peel off. Take oil and coat the whole surface before painting. On such a base oil paints will adhere perfectly. Skim milk, sweet, mixed to the thickness of cream with fresh common cistern cement, any of the earthy pigments being added, makes an excellent paint for such surface, the lime in the cement and the caseine in the milk making an insoluble compound.

Pencils.—Lettering and striping pencils should have all the colour well cleaned out of them and be pointed in oil before being put away.

Permanent Whitewash.—Slake half a bushel of fresh lime with boiling water, covering it to retain the steam. Strain through a fine sieve, add 7 lb. of salt, previously dissolved in warm water, ground rice, boiled to a paste and stirred in boiling hot; $\frac{1}{2}$ lb. of powdered Spanish whiting, 1 lb. of clean glue, previously dissolved. Add 5 gallons of hot water to the mixture, stir well, then let it stand for a few days, well protected from all dust and dirt. Apply hot. A quart of this mixture will more than cover a square yard. Colouring matter may be used to produce any desired shade.

Personal Cleanliness.—This is a virtue deserving of the most rigid observance in the painting business; and food should never be partaken of in the workshops or on the "jobs."

Pigments.—What is required in a pigment forming a good primer is—(1) That its chemical composition should be such that it will not have any deleterious influence upon the linseed oil used as a vehicle for its application; (2) that it should absorb large quantities of oil; and (3) that it should be extremely finely ground in oil to make it enter the pores of the wood with the oil, and form a filler as well as a primer.

Preparing Plastered Walls.—A very important thing in wall painting is to have a good, sound, smooth surface to work upon. Cracks and other blemishes must be filled up, and the wall thoroughly sandpapered, to make it even and smooth. Wrap the sandpaper around a flat piece of cork. Give a coat of patent size, and when dry rub smooth again. Then mix the paint with gold size.

Priming.—When new work is to be primed for graining, see that it has plenty of lead, in order to give body. On this apply at least three thin coats of colour for a good job, and see that there are no brush marks left. When using ochre for priming purposes, it should be finely ground, and thinned with raw linseed oil. A little white lead added to it improves it, and it is best to apply it quite thin.

Priming Coat.—Many painters do not give much attention to this most important of all coats. They seem to think and act as if anything were good enough for a primer. We have at times seen odds and ends and the slush tub furnish the material for priming; and if for any reason a lot of paint is condemned as unfit for finishing coats, it is reserved and thought to be good enough for the first coat. It is, however, of the utmost importance that the priming should receive the greatest attention and care, as if it is neglected the whole superadded coats are bound to be defective. It matters little

how good these may be nor how careful the workmanship; there cannot but be trouble in the near future. Wood is composed of bundles of thread-like filaments; where these filaments have been sawn through they present the appearance of pores. Under microscopic examination it will be found that there is considerable space between the filaments, and that they are not solidly laid against each other. These interstices it is that the primer is called on to fill. The primer will be found to have little bits of roots, which form clinchers. These clinchers have a great hold upon the wood, and it is of the utmost importance that both the pigment and the vehicle shall be of the best quality and of the proper nature. The vehicle should be raw linseed oil, for this penetrates much farther than the boiled will, and for that reason the latter should not be employed (authorities differ on this, so no hard and fast rule can be set down). Earth colours are the best for priming, the ochres being at the head of the list. The addition of a quarter to a third by weight of white lead is an improvement, as the paint is then more porous and the next coat can penetrate it. Never use a dry ochre underground for priming. Zinc should never be used in priming, as it has a tendency to peel off. Too great a body is not desirable in a primer.

Red Lead and Litharge.—Many give these the preference above all driers, especially the red lead. All driers, when boiled with oil, tend to change the elastic oil rubber into oxy-linseed oil acid, with which they form hard but brittle soaps. Red lead forms with this acid a peculiarly hard soap, but if only 2 or 3 per cent. of the lead be used, the oil is hardened without losing its elastic qualities. Red lead gives up its oxygen at once to the oil, and probably does not continue to take up oxygen from the air to the same degree as does manganese. When lead is boiled with oil, it rises to the surface with the boiling, and probably takes up some oxygen from the

air, carrying it down into the oil. Manganese acts in the same way. As a soap in the applied and drying oil it is very doubtful if red lead takes up any oxygen from the air. Red lead has both experimental and practical testimony in its favour as a most useful drier. It gives immediately a hard oil, which retains its elasticity. On the other hand, the disadvantages of red lead are serious. Any lead in oil liquid driers, gold size, or varnish may have an injurious effect on all pigments containing an excess of sulphur, or sulphur gas may affect it. These are especially genuine vermilion, cadmium yellow, artificial ultramarine, and many of the lakes. In all these sulphur is used, and in many of them sulphur may be in excess, left there purposely as an adulteration or otherwise.

Removing Old Paint.—Old paint and varnish may be removed from wood and iron by applying a mixture of 1 part of American pearlash to 3 parts of quicklime. Slake the lime with water and add the pearlash, making the mixture of the consistency of paint. With an old brush lay the mixture over the whole of the surface to be cleaned, and after fourteen or sixteen hours the paint, etc., can easily be scraped off. Another recipe says: 2 lb. sal soda, $\frac{1}{4}$ lb. quicklime, 1 gallon warm water. Stir well, and apply hot or cold, and allow it to remain fifteen or twenty minutes; then scrape the paint off, and wash thoroughly with acidulated water (vinegar and water), which is for the purpose of neutralising the alkali and to stop its action on the wood, and more still, upon the repainting.

Removing Yellow Tinge.—To take the yellow tinge out of white lead paint, add a very little Prussian blue.

Sizing for Sign Work.—One of the best mordants or sizing for sign work is made by exposing boiled linseed oil to a strong heat in a pan; when it begins to smoke, set fire to

the oil, allow it to burn a moment, and then suddenly extinguish it by covering the pan. When cold it will be ready for use, but will require thinning with a little turpentine.

Softening Paint Brushes.—Make a hot saturated solution of washing soda, and having rubbed as much soap into the brush as can be got into it, leave it soaking, repeating as it becomes soft. Soak only the hair part; not the fastening.

Stencilling.—The first thing to be considered is the style of building about to be decorated, and the patterns that would best suit it. Thus a church requires set patterns, with sombre and rich colouring, while for a public hall or house bright trailing patterns can be safely used with much gilding. For a really successful design, care must be taken that each part is in proportion, and that the colours are not in discord, and, to obtain a perfect whole, no one part of the design must strike upon the eye so prominently as to engross the attention to the exclusion of the rest of the pattern; and a building painted from half a dozen patterns, well grouped and matched as to colour, will look better, and be in far better taste, than one surrounded with a heterogeneous medley of designs that do not group, and that puzzle and bewilder the mind instead of conveying the idea of relief and pleasure. The materials required for water-colour stencilling are as follows: Colours in powder, japanners' gold size, knotting varnish, turpentine, hog's hair and sable brushes, square of glass, T-square, foot-rule, string and lead weight, maul-stick, earthen pots of various sizes, and gilder's cushion and knife. A brick wall well covered with plaster is the best surface; and where the whole of the plaster is retained as the ground colour, no further preparation is needed. Ashlar and rubble walls are bad, as the dampness of the atmosphere condenses on them and makes them wet, and stone walls, being porous, have to be prepared before they

are fit to receive colour. In all cases time must be allowed to elapse between building and decorating. Should the pattern be required to be painted on a brick or stone wall unplastered, a sufficient quantity of patent size must be melted down in a saucepan with twice its quantity of water, and the walls being freed from dust must be brushed carefully over with this solution, no space being omitted. When it is wished to colour the plaster and not retain the white surface as a ground, the wall must be examined and mended with putty and plaster of Paris should any pieces be broken away, and then brushed over with a size composed of 1 lb. of glue dissolved in 1 gallon of hot water, thickened with red lead and patent size, and allowed to dry. Then in a large double-sized paint-pot put 3 lb. of 'gilder's whiting; cover it with water, and leave until broken up and all working over; then pour off the water, and stir with a thick stick. Melt the patent size, stain it up to the tint desired for the ground and the wall, pour it upon the whiting, and strain while warm. Let it stand for several days, and use when in a weak and trembling state. Apply it to the walls with a long hog's hair brush—work from top to bottom—and cover the ground as you proceed, as no retouching can be done. All colours dry lighter than when first put on, and to obtain the right shade it must be tried first on paper, and allowed to dry. White is never used for a ground, unless mixed with umber, blue, or ochre, to take off its staring crude appearance. Patterns are usually cut out upon thin strips of tin, but a cheaper way is to buy the design drawn upon paper, and to transfer it to millboard or thick brown paper, brushed over with knotting varnish; then lay the millboard upon a sheet of thick glass, and with a sharp penknife cut out the pattern, leaving little bars to hold it together where it would fall away if entirely cut out. The bars can afterwards be filled in with the colours used in the design, but they are frequently left, as they impart a certain quaintness. We will suppose it

is desired to paint a church, where the roof and the wall join. The straight line of the roof requires that a straight pattern should be employed, and the depth of the pattern must depend upon the height of the wall. A depth of 36 in. is an average size; three straight lines are drawn with a rule the entire length of the wall, close to the roof, with an interval of 2 in. between them. These are afterwards filled in with contrasting bands of colour. Then a line is drawn to the depth of 24 in. below the lowest band to hold the set pattern, and three more 2 in. lines are drawn below it and filled with bands of colour like those above. Then the millboard pattern is prepared. It must not be more than 24 in. in length, as it is held in its place on the wall by hand, and it is better to have more than one of these if there is a long wall to cover, as too frequent use makes the edges moist and uneven. Care must be taken that the pattern has guiding lines and marks to show where the next pattern is to join on. This is laid evenly on the space left between the lines, which space has a ground colour of ochre upon it. The colour of the leaves, stems, and part of buds, which are of a chocolate brown, is applied with a stiff hog's hair brush (the powder is mixed with turpentine and japanners' gold size very stiffly), the space left for the flower being filled in with white, also the upper portion of buds, and if the pattern is held firmly and closely in its place, and the colour not put on wet, when the millboard is removed the design is clearly painted on the wall, and is as clean and well defined as if really drawn by the hand. When several patterns are thus completed, the painting should be gone over again with a long sable hair brush, the edges of the flower marked out with black, the centre filled in with yellow, the small rounds at the side of the pattern with red, and the bars that join the pattern painted over. The bands on the outside can be filled in according to taste, but it must not be forgotten that in all church decorations dull greens, browns, reds, and

greys are the proper colours to use, with a little gold and vermilion here and there introduced, as bright colours used in abundance do not produce the same effect as a judicious dull colouring with here and there a dash of gold.

Sulphate of Zinc.—Sulphate of zinc or white vitriol was perhaps the first drier used in oil painting, but it is not much employed now.

Tests for Distinguishing Pigments.—In order to ascertain with which colour a fabric or paper has been tinted or blued, the following may be useful: paper or any fabric tinted with aniline blue, when exposed to sunlight fades in a few hours. If ultramarine or cobalt blue has been used for tinting, a blue ash will remain after incineration. These ashes are discoloured by dilute acids if ultramarine was employed, while cobalt blue will only become brighter by the same treatment. Prussian blue is detected by the presence of iron in the ashes of the fabric or paper. The latter may be charred in a platinum capsule, the ash being treated with some dilute muriatic acid, a drop of which is taken with a glass rod, and allowed to fall on the ash, contained in a watch-glass, and placed on a piece of white paper. By afterwards adding a drop of sulpho-cyanide of potassium in solution, a red coloration will detect the iron. Yellow prussiate will give a greenish coloration.

Tests for Turpentine.—Colour, crystal clear and water white; commercial weight, 7 lb. to the gallon; boiling point, 160° to 165° C., 320° to 340° F.; specific gravity, at 12° C. or 60° F., 31° B. (0·875); usual adulterants, resin oil, petroleum (benzine or naphtha): headlight oil (150° test). Test 1.—Let a small quantity evaporate from a cup. Resin oil will remain a sticky deposit, giving off, when ignited, the odour of resin.

Test 2.—Place a few drops on white writing-paper. If pure, all traces will disappear within half an hour. Petroleum and resin oil leave a greasy stain. If no stain remains, concentrate a small portion by allowing it to evaporate; then test as before. Smell the concentrated portion for "coal oil" odour, and burn for the resin odour. Test 3.—Place 10 drops in a watch crystal, and float on water heated to about 170° F. If pure, evaporation will be complete in seven minutes; if not, petroleum is present. Weigh the watch crystal, and place in it 10 drops of the adulterated turps. In another glass put 10 drops of the pure turpentine; float both on water at 170°. When the pure turps has evaporated, remove and weigh the other crystal. The difference between the result and the weight of crystal empty indicates four-fifths of the quantity of petroleum contained. Percentage is calculated from the known weight of the original 10 drops. Test 4.—Fill two deep glass vessels, one with pure, and the other with the suspected turpentine; hold over a sheet of black paper, and look directly down into them. The presence of petroleum (headlight oil, etc.) is indicated by the bluish yellow bloom or cloud (fluorescence) it imparts. Test 5.—Benzine (naphtha) evaporates rapidly, usually betrayed by odour. With hydrometer, 5 per cent. raises gravity $1\frac{1}{2}$° B. Pure turps at 60° F. is 31°; with 5 per cent. benzine, $32\frac{1}{2}$°; 15 per cent., 34°; 25 per cent., 38°. Five per cent. headlight oil raises gravity $\frac{1}{2}$°; with 5 per cent. gravity, $31\frac{1}{2}$°; 10 per cent., 32°; 25 per cent., 34°; $33\frac{1}{2}$ per cent., $35\frac{1}{2}$°. Test 5.—Adulterants affect viscosity. Take two similar vials; fill one with pure turps, the other with the suspected article. Hold side by side in the hand and shake. If pure, the bubbles will instantly disappear from both. Any adulteration will retard their disappearance.

Thinning.—In thinning thick colour of any kind, when taken from the can beat it thoroughly before adding liquid;

then add a small portion at a time, beating thoroughly after each addition until the desired consistency is attained. If a thinner is added in a large quantity no amount of stirring or beating will break the lumps, and straining will be necessary. This rule applies to almost every thick paste or mass. Keg lead can be mixed quickly and nicely also in this way.

Twelve Practical Rules for Painters.—(1) Let the ground of your work be properly cleaned, prepared, and dry. (2) See that your colours are equally well ground and duly mixed. (3) Do not mix much more nor any less paint than is necessary for the work in hand. (4) Keep the paint well mixed while the work is going on. (5) Have the paint of due thickness, and lay it on equally and evenly. (6) Do not apply a succeeding coat of paint before the previous one is sufficiently dry. (7) Do not employ a lighter colour over a darker. (8) Do not add driers to colours long before they are used. (9) Avoid using any excess of drier, or a mixture of different sorts. (10) Do not overcharge a brush with paint, nor replenish it before it is sufficiently exhausted. (11) Begin with the highest part, and proceed downwards with the work. (12) Do your work to the best of your ability, honestly; for such you will find the best policy both for yourself and your employer.

Ultramarine, Testing.—To test ultramarine, take a certain quantity by weight and mix it with a similar quantity by weight of a fine white powder, such as barytes or zinc white. It is necessary to have previously prepared a series of samples, made by mixing a known quantity of ultramarine taken as the standard, with different quantities of the white powder. The weights employed in preparing the scale are, of course, used in making each trial, and then the standards are compared, until the one most similar to the trial mixture is reached. A suitable scale would be 2 oz. of white in each

case, mixed with the following percentage of the standard ultramarine: 25, 15, 10, 5, 2·5, 1·5, 1·05, 0·25, 0·15. Another and simpler method is to weigh out 20 grms. of ground barytes into separate mortars, and ½ grm. or 1 grm. of each pigment sample on to a watch-glass. Each is then well ground up, adding the ultramarine little by little, until a standard tint is arrived at. After weighing the watch-glasses and then finding out how much pigment is left on each, it is easy to calculate the colouring powers of the samples, which are of course inversely as the weight employed. Besides colouring power, there are some other qualities in ultramarine which it is necessary for the tradesman to test. The resistance to the decomposing power of alum is tested by observing how long it takes to decolorise a known quantity of the standard in contact with a known volume of cold saturated alum solution. Exactly the same operation is conducted with each sample to be tested, and from the time relative values are calculated. The fineness of ultramarine is best tested after an inspection with a magnifying glass, by friction on a polished piece of brass. This ought not to show the slightest scratch. The best test to be made is for power of resisting gelatine and albumen. Some ultramarine will, when mixed with warm water and gelatine, after twelve hours, especially in summer, yield a thick clot, smelling strongly of sulphuretted hydrogen. An ultramarine which, when mixed with an equal weight of egg albumen and five times its weight of lukewarm water, after standing for eighteen hours at a temperature of 29° C., does not form a thick clot, must be pronounced to fulfil all fair expectations as to its inalterability toward this decomposing agent.

Using Quick-Drying Colours.—Do not use quick-drying colour, especially on bodies, too thick; for if you do, nine times out of ten, brush marks will disfigure the work. Colour ground

in japan will naturally thicken under the brush, so that in mixing it should be made thin enough to work freely and evenly. Like varnish, it should be put on quickly, worked properly, and left alone. Do not try the "teasing" process and expect highly satisfactory results. Lay the colour on, if doing bodies, with vertical strokes of the brush, finishing with horizontal or lengthwise strokes. Keep away from open windows where draughts occur, and also away at a safe distance from an intensely heated stove. A surface several degrees warmer than the normal heat of the room in which you are working will be found a very difficult thing to work colour upon.

Zinc White.—While zinc white as a paint when used for interior work is also exposed to carbonic acid, it is not exposed to moisture, as in exterior work, and is therefore permanent.

Zinc Writing.—If ever the "handy man" in the painting line is called on to do a little writing on zinc, say for garden labels or any similar purpose, the following will be found an easy but not particularly quick method: Squeeze the juice from a lemon into a gallipot, and into it put an old copper coin (not the present bronze coinage), or, failing this, a bit of copper, which let stand for a couple of days. Then use with a quill pen. There are other formulæ, but the above is the simplest.

PAPERHANGING

Cement for Paper.—A very good mastic cement for use in making fancy articles of paper is made by soaking 5 oz. of glue in 20 fluid oz. of water for twenty-four hours, and then dissolving in the fluid 9 oz. of sugar-candy or coarse brown Demerara sugar and 3 oz. of gum arabic in powder, warming the mixture to effect solution.

Cleaning Wallpaper.—Mix 4 lbs. of common wheaten flour with 2 pints of cold water. Knead this into a stiff dough, and form it into two or three balls. Wipe the paper all over with it, and as the dough becomes dirty, work the soiled parts into the middle and the clean parts outside. This quantity will be found sufficient to clean a very large room. Rye and wheat flour are mixed together into a dough, which is then partially cooked or baked and the crust removed. To the cooked rye and wheat flour, chloride of sodium (or common salt) and powdered or pulverised naphthaline are added, and into the mixture corn meal and burnt umber are put. The proportions of the several ingredients may be largely varied, but the following gives good results: 1 lb. of rye flour, 1 lb. of wheat flour, 1 oz. of salt, $\frac{1}{2}$ oz. of solid naphthaline properly pulverised, 1 oz. of corn meal, and $\frac{1}{8}$ oz. of burnt umber. The salt is a cleansing medium, and also preserves the composition. The pulverised naphthaline makes the mixture of an absorbent nature, aids in preserving it, and acts as a

disinfectant, while it counteracts the odour of the baked flour. The corn meal and rye flour toughen it, and make it of a putty-like consistency. In using, take a handful and rub it over the surface to be cleaned in one direction only.

Colour in Wallpaper.—In the manufacture as well as the selection of wallpaper for decorative use, nine-tenths of the effect produced results from a knowledge of the laws of harmony and contrast in colour. Very few people possess that degree of taste that might guide them in their selection. They are dependent on the guidance of men who are not only naturally expert in the use of colour, but who have made a study of the discoveries of fellow-artists in all ages. What can be taught about colour required vast genius to discover. The highest skill is the result of practice and a fortunate organisation which we call natural genius for the production of artistic work. There are general truths regarding colour which ought to be at the finger-ends of every one who makes, deals in, or decorates with paperhangings. A volume might be written on this subject, but a few of the leading principles will suffice. Red breaks and diffuses with white with peculiar loveliness and beauty, but it is discordant when standing with orange only, and requires to be joined or accompanied by their proper contrast to resolve or harmonise their harshness. As a colour, red is in itself pre-eminently beautiful, powerful, cheering, and communicates these qualities to its two secondaries, and their sentiments to the mind. Blue bears the same relation to shade that yellow does to light; hence it is the most retiring and diffusive of all colours except purple and black, and all colours have the power of throwing it. The harmonising, neutralising, or contrasting colour of russet is a deep green; when the russet inclines to orange it is grey or subdued blue. Brown is a sober and sedate colour, grave and solemn, but not dismal, and contributes to

the expression of strength, stability, and solidity, vigour and warmth, and in a minor degree to the serious, the sombre, and the sad. The principal discord of green is blue, and when they approximate or accompany each other they require to be resolved by the opposition of warm colours; and it is in this way that the warmth of distance and the horizon reconcile the azure of the sky with the green of the landscape. The contrast or harmonising colour of purple is yellow. In a warm light yellow becomes totally lost, but is less diminished than all other colours, excepting white, by distance. The stronger tones of any colour subdue its fainter hues in the same proportion as opposite colours and contrasts exalt them. Of all colours, except white, yellow contrasts black most powerfully. The sensible effects of yellow are gaudy, glorious, full of lustre, etc., and its impression on the mind partakes of these characters. Red in connection with yellow becomes hot and advancing, but mixed with blue it becomes cool and retiring. Next to green, purple is the most generally pleasing, and has been celebrated as a regal or imperial colour, as much perhaps from its rareness in a pure state as from its individual beauty. Purple, when inclining towards redness, is a regal, magisterial, and pompous colour. In its effects on the mind it partakes principally, however, of the power of its ruling colour, blue. The harmonising contrast of citrine is a deep purple. The harmonising contrast of olive is a deep orange. Bronze is an advancing colour. Of all compound colours green is the most effective, distinct, and striking. As green is the most general colour of vegetable nature, and principal in foliage, so red, its harmonising colour, and compounds of red, are most general and principal in flowers. Impure black is brown, but black in its purity is a cold colour, and communicates this property to all eight colours; thus it blues white, greens yellow, purples red, and degrades blue; hence the artist errs who regards black as of nearest affinity to test and brown colours. White as a ground colour sets off

charmingly blues, purples, browns, violets, greens, and reds. Blue with gold, pink, buff, salmon, light blues, drabs, and yellows; red with lemon, pale blues, gold, and greens. On a ground of black the colours to harmonise best in contrast are pink, lemon, drab, gold, greens, light blues, salmon, and purple. Care should be taken not to place two shades side by side that are of the same depth of tone; the effect is very bad, giving out a glimmer not at all pleasing; in fact, the result is anything but artistic. It is not necessary that the dividing line should be visible; on the contrary, it is cunningly concealed, one tint softly melting into the other. Olive is a retiring colour. Wall-paper a light shade of grey, the harmonising accompaniments would be—dado, darker shades of grey, relieved by a few narrow lines and touches of pure vermilion. Paper, cream colour; dado, shades of Vandyke brown. Paper, fawn colour; dado, flowers with tints of salmon and orange, shaded with lake; leaves and stems of shades of greys and browns. Paper, pale terra-cotta; dado, deep shade of terra-cotta, with Egyptian designs outlined in black. The walls should be of a warmer and stronger hue than the ceiling, and the dado should be darker than the walls. Scarlet or gold-coloured flowers look best on a black ground; on an oak-coloured paper more delicate shades have a pleasing effect—for instance, apple blossoms, azaleas, or similar blooms. The ground of the paper may be different from the general colour of the design. Black may be advantageously combined not only with sombre colours to produce harmonies of analogy, but also with light and brilliant colours to produce harmonies of contrast, as may be seen in the work of Chinese artists. Light blue and light red papers assort better with white than dark blue and dark red papers, because the latter present too great a contrast of tone. Flowers often exhibit associations which on plain papers would appear very disagreeable; as, for instance, in the sweet pea, in which red and violet are associated. The lowering of the

tone of a colour is always perceptible, but a very remarkable fact is the weakening of the black itself, when the contiguous colour is sombre and of a nature that yields a luminous complementary, such as orange, orange yellow, greenish yellow, etc. Take a blue paper, put it in contrast with a greenish blue paper; the first will incline to violet, and the second will appear yellower. Put the same blue paper in contact with a violet blue; the first will incline to green, and the second will appear redder; so that the same blue will in the one case appear violet, and in the other greenish. Take a red paper and place it in contact with orange red paper; the first will appear purple, and the second yellower. But if we put the first red in contact with a purple red, this latter will appear bluer, and the other yellower or orange.

Enamelling Papers.—The following are a few methods for enamelling paper to make it waterproof: (1) Paraffin is melted in a large metal boiler by heating with a fire or steam coil. When it is perfectly fluid the fire is withdrawn or the steam shut off, and the mass cooled and stirred till it begins to solidify around the edges. Six parts of petroleum, ether, or bisulphide of carbon are added, and the mixture stirred till it becomes solid. (2) The paraffin cake is cut into thin shavings with a knife, and placed in an air-tight closed vessel. Five times its weight of bisulphide of carbon is then poured over it, and allowed to stand for three days or so, till it is completely dissolved. By this time the paraffin will be intimately combined with the bisulphide of carbon, forming a thick milky mass. The paraffin dissolved according to prescriptions Nos. 1 and 2 is added to the colour as follows:—100 parts of blanc fixe, together with the necessary colour to produce the desired shade, are mixed and thoroughly worked up with 11 to 15 parts of gelatine (glue), previously soaked in water. From 12 to 17 parts of dissolved paraffin, and about 12 parts of softened wax,

such as is usually employed in the manufacture of enamelled papers, are then added. If the colour mixture is too thick for covering, it is thinned down with a corresponding quantity of lukewarm water. It is passed through a fine hair sieve before it is ready for use. (3) The paraffin can be added to the colour without previously dissolving it in petroleum or bisulphide of carbon, in the following way :—It is cut into thin shavings mixed with the colour paste, and the mixture heated to 40° C. with continued stirring, till both are thoroughly and completely incorporated. Of the above methods the first two are preferable to the third, as the solution of the paraffin is somewhat incomplete in the latter. Papers enamelled with the above mixture are washable, and are capable of being very highly glazed. The colour mixture should be used up as quickly as possible.

Hanging Wallpapers.—Besides injurious consequences arising from the use of poisonous colours, the too frequent custom of hanging fresh papers on the walls of a room without removing the old papers, however many they may be, is one which cannot be too strongly condemned. When it is remembered not only that the paper itself is almost entirely composed of vegetable substances, but that the paste with which it is put on is vegetable also, and frequently not of the purest description, the readiness with which a mass of some half a dozen layers decays, and ultimately becomes putrid, is easily understood. In repapering old walls, it is then of the first importance to clear away all vestiges of the old papers before proceeding to hang the new one. Of course in many instances this involves additional trouble in the shape of making good the surface of the plaster; the process of scraping off the old papers often resulting in small pieces of the plaster being removed. Additional trouble obviously means extra expense; hence the adoption of the custom at the expense of health. A good

decorator will always clear well his walls before decorating. This is to be commended both on the score of cleanliness and also as affording a good surface for applying the paper. Paste to be used for paperhanging should be made of the best white wheaten flour and clean water. Gum arabic, alum, or resin are generally added, and much improves the paste.

How to Measure a Room for Wallpaper. — The following will give the information, which however is only approximately correct, but sufficiently accurate for all practical purposes. To determine the number of rolls of wallpaper to cover the walls of a room, measure the circumference, from which deduct the width of doors and windows, and divide the remainder by 3. Example: Let us suppose a room 12×16 ft., which has two doors and two windows, which average 4 ft. wide.

$$12 + 12 + 16 + 16 = 56, \text{ circumference.}$$
$$4 \times 4 = 16, \text{ doors and windows}$$

$$\begin{array}{r} 56 \\ 16 \\ \hline 3)40 \\ \hline 13\tfrac{1}{3}, \end{array}$$ or say 14 rolls.

This rule is calculated for a room of not less than 10 or more than 12 ft. in height. For a room under 10 ft. high, and requiring a frieze, say, of 6 in., proceed as before with the measurement of the room, deducting the width of doors and windows. But in this case multiply the remainder by 2 and divide by 15, for this reason, that we can cut 5 lengths out of a double roll, which, placed side by side on the wall, covers a space 7 ft. 6 in. from the ceiling, and instead of multiplying

by 7 ft. 6 in., we multiply both by 2. Example: Take a room 14 × 14, with two doors and window.

Circumference of room,	56
Less for doors and window,	12
	44
	2
	15)88
	$5\frac{13}{15}$

Say 6 double rolls, or 12 pieces. Of course, if a dado is required, its width will determine how much paper will have to be deducted.

Lacquer for Dark Wallpaper.—Wallpaper coated with the following lacquer can be washed with soap and water without suffering injury:—Borax, 1·05 oz.; shellac or sticklac, 1·05 oz., dissolved in 10·5 oz. of hot water. The solution is then strained through a close cloth, and the lacquer is applied to the wallpaper either before or after it is put upon the wall. When dry the paper is brushed with a soft brush, which will give it a fine lustre. The paper should receive two coats, which are applied in the usual manner with a brush; but of course the first coat should be thoroughly dry before the second is laid on.

Paperhangers' Pastes.—4 lb. of fine wheaten flour are mixed with a small quantity of cold water, thoroughly stirred; 2 oz. of powdered alum are then added, and when dissolved a gallon of boiling water. When cooled it may be thinned as desired with cold water, and used. Another recipe runs thus:—First heat water to boiling point, then add flour while constantly stirring; to prevent the formation of lumps the flour

may have been previously passed through a sieve. Agitation is continued until the heat has rendered the mass of the desired consistency, and after a few moments' further boiling it is ready for use. In order to increase its strength, powdered resin in the proportion of one-sixth to one-fourth of the weight of the flour is added. To prevent its souring, oil of cloves or a few drops of carbolic acid are added.

Paperhanging Cement.—The following is the formula employed by a practical paperhanger :—By adding a few drops of carbolic acid to the mass when it is prepared, you can prevent fermentation, which will otherwise take place in a few days of summer weather, rendering it thin, watery, and useless. A sufficient quantity of carbolic acid will cause it to keep almost indefinitely, and does not in the least injure the quality of the paste. Beat up 4 lb. of good white wheaten flour in cold water—enough to form a stiff batter—sifting the flour first, and beating it well to take out all the lumps. Then add about 2 oz. of well-powdered alum. Have a quantity of boiling water ready at hand, take it boiling from the fire, and pour it gently and quickly over the batter, stirring it rapidly at the same time ; and when it is observed to swell and lose the white colour of the flour, it is cooked and finished. The quantities here indicated should make three-fourths of a pail of solid paste. It is recommended not to use while hot, as when cold it adheres better and goes farther. A little cold water poured over the top of the mass will prevent the formation of a skin from the drying out of the paste. When about to use, a small additional quantity of cold water should be added, so that the paste will spread evenly and quickly under the brush.

Papering Rooms.—Light shades of paper make a room much more cheerful. Large figures make a room look much

smaller and cause much waste in matching. Low rooms should be papered with striped paper, the stripes running up and down, thus causing the room to look higher than it really is. Subdued tints correct the fault—the glare—of too many windows. The best effect is produced by having a paper with pattern and colours of a quiet tone, such as do not at once strike the eye on entering the room. The paper should relieve and set out the furniture that stands in front of it, not attract attention to it.

Papering Walls.—In cleaning and sizing walls, the workman should always take care to do it thoroughly round the wainscoting, and then there will be no trouble from wall-paper curling up at the edges.

Papering Whitewashed Wall.—If you have a whitewashed wall to paper over, soak it well with water, and go over the wall thoroughly with a scraper. This removes the whitewash, so that the paper will not give any trouble by peeling off.

Preparation for Paperhanging.—The preparation required before paperhanging varies according to the state or condition of the apartments. If it is a newly built house, it will be quite necessary to ascertain that the walls are thoroughly dry, and should any damp be observed in any part, after a sufficient time has elapsed for the mortar and stonework to dry, means must be adopted either to cure the defect or to keep the damp back from the paper when it is hung. If this is not done, the damp will disfigure the paper, and it will mildew and come off the wall. Very often the damp-proof paper will for a long time effectually keep back the damp, but thin sheet-lead must be resorted to where the first proves insufficient. Many walls will be better with a coat of thin size before commencing to hang the paper; and

in best rooms, where a good paper is meant to be hung, it would be advisable to first hang lining paper, when you will have a smooth foundation to work upon, and is not then likely to be stained from the back from any cause. When a room is meant to be repapered, all the loose paper must be torn down, and defects in the walls made good by pasting on brown paper, while crevices requiring to be stopped round doors, windows, fireplaces, or cupboards, must be made good with plaster. When bedrooms require repapering, it is sometimes advisable, and may be also the wish of the occupier, to have the whole of the paper stripped off, which is certainly the best plan from a sanitary and all other points of view; in that case the washing down brush and some warm water will soon effect the desired end. When walls are in a very bad condition, it is oftentimes best to plug the walls and put up battens, when canvas can be tightly strained, and tacked on and sized. Be careful not to put the battens too wide apart, or the canvas may strain and get loose. This is a good method to adopt with an incurably damp wall. It is scarcely necessary to mention that all ceilings should be whitened and painting finished before the paperhanger commences his work; and it is advisable to clear off any paper, and do any preparation that is required, before the painters are employed. It is seldom the ceilings of a good house require papering, but in old houses the ceilings are improved by so doing. They are generally found very badly cracked and thick with limewash. In this case the paper will be found to improve the appearance of the room; and at a future time when thought necessary for other treatment. Previous to getting to work, the old limewash must be all scraped off, and a good coat of size laid on.

Removing Grease from Wallpaper.—To remove grease from wallpaper, place some brown paper over the spot,

ironing it with a hot iron until all the grease has been absorbed, moving the paper from time to time.

Shellac Spirit for Hanging Paper.—This can be utilised for hanging on damp walls. It consists in coating a lining paper on one side with a solution of shellac spirit, of somewhat greater consistency than the ordinary French polish, and then hanging it up with the side thus treated to the damp wall. The paperhanging is then performed in the usual manner with paste. Any other resin that is equally soluble in spirits may be used in place of the shellac. This process will be found equally effective in preventing the penetration of dampness.

Simple Tests for Wallpapers.—(1) A simple test requires only an ordinary gas jet, which is turned down to quite a pinpoint, until the flame is wholly blue. When this has been done, a strip of the paper suspected to contain arsenic is cut one-sixteenth of an inch wide and an inch or two long. Directly the edge of this paper is brought into contact with the outer edge of the gas flame a grey coloration due to arsenic will be seen in the flame. (2) The paper is burned a little, and the fumes that are given off will be found to have a strong garlick-like odour, due to the vapour of arsenic acid. (3) Take the paper away from the flames and look at the charred end—the carbon will be coloured a bronze red; this is a copper reduced by the carbon. (4) Being now away from the flame in a fine state of division, the copper is slightly oxidised by the air, and on placing the charred end a second time, not too far into the flame, the flame will now be coloured green by copper. Tests 1 and 2 would be yielded by any paper containing arsenic in considerable quantities.

Varnishing Wallpaper.—Before commencing to varnish a paper, the workman must give the same one or two coats of

weak size, made from glue, being careful to touch every part, or it will show greasy. When dry it is ready for varnish. If a white paper, the glue must be clear, or it will tint the paper. All paper will not varnish. After the paper is hung and is thoroughly dry, it is coated with a layer of size made from the best glue (gelatine in scales), of which about 2 lb. will suffice for an ordinary room 16 × 13 × 13 ft. The size is prepared by boiling the glue in a sufficient quantity of water, and is applied very evenly and carefully with a brush. After leaving for twenty-four hours to dry, this layer is covered with a thin coating of dammar varnish. It is advisable to try the effect of the varnish on different parts of the surface before commencing the work in earnest, in order that a second coating of size may be applied if the first was not sufficient to prevent the varnish from soaking into the paper. Wallpapers so coated may be washed with a soft brush, just like wood panelling.

Wallpaper.—In the selection of wallpaper one needs to beware of large patterns and glaring contrasts of colours, as, apart from taste, these weary the eye. Give preference to neutral tints and colours which harmonise and agreeably blend with the tones of the furniture and carpet. If ceilings are low, they will appear much higher by adopting for borders painted figures that run perpendicularly through the wallpaper. This should always be chosen with particular reference to the wall treatment and the room furnishing. If pictures are to be hung, choose a low-toned neutral colour without any definite or pronounced design in the paper. If the room is to be plainly furnished without pictures, choose a brilliant wallpaper, rich in colour, mounted in plain white or pearl-coloured paint, and select soft white draperies.

Waterproof Luminous Paper.—For preparing a waterproof paper which will shine in the dark, the following mixture

is given: 40 parts of paper stock, 10 parts phosphorescent powder, 10 parts water, 1 part of gelatine, and 1 part of bichromate of potash.

Waterproof Paper Varnishes.—(1) 1 part Pinear resin and 4 to 6 parts acetone are digested in a closed flask for two weeks, and the clear solution poured off. To this 4 parts of collodion are added, and the whole allowed to clear by standing. (2) 30 parts white shellac are digested with 500 parts of ether, and to the solution 15 parts of lead carbonate are added, then shaken for some time and repeatedly filtered. (3) 5 parts glue are dissolved in 100 parts warm water, and this solution spread on paper. After drying, the paper is soaked for an hour in 10 per cent. solution of acetate of alumina, and again dried, in order to give it a final glaze. (4) 120 parts of linseed oil are heated and poured into a mixture of 33 parts of quicklime and 22 parts of water, to which 55 parts of melted caoutchouc have been added, stirring all the time. The varnish is strained and used hot. (5) 1 part of gutta-percha is carefully digested in 40 parts benzine in the water-bath, and the paper covered with it. This varnish can be drawn or written on.

MISCELLANEOUS

A Useful Cement.—Alum and plaster of Paris, mixed with water and used in the liquid state, form a hard composition and a useful cement.

Barytes in Chrome Yellow.—The detection of barytes in chrome yellow is a very simple matter, and as it is a very commonly employed adulterant, the following may be found useful: Put a small portion of the yellow into a test tube; add a sufficient quantity of concentrated muriatic acid, and boil. The yellow is almost immediately resolved into a white semi-crystalline chloride of lead and a green solution of chloride of chromium. A large amount of water is added to the test, which is again boiled. If there is no barytes present, a clear solution will be formed, as chloride of lead is soluble in boiling water. The barytes, if present, will be left behind as a heavy, fine white deposit, which may be washed by repeatedly boiling with water.

Bathrooms.—These should be warm in colouring, to assist a feeling of warmth during the winter toilet; and they should of course be washable in every part, as otherwise the steam from hot baths may destroy the work in a very short time.

Black Varnish for Ironwork.—The following is recommended as a good recipe for a black varnish for ironwork: Take $\frac{1}{2}$ lb. of asphaltum and $\frac{1}{4}$ lb. of resin, and dissolve in

1 pint of turpentine; rub 2 oz. of lamp-black with a little linseed oil to form a paste, and stir this into the first-mentioned ingredients. The mixture, now being ready, can be painted on any ironwork with a soft flat brush.

Boiling Points.—Mercury, 630° F.; linseed oil, 266° F.; olive oil, 412° F.; sulphuric acid, 410° F.; oil turpentine, 315° F.; water, 212° F.; and alcohol, 174° F.

Carver's Polish.—In 1 pint of spirits of wine dissolve 2 oz. of seedlac and 2 oz. of white resin. The principal use of this polish is for the carved parts of cabinet work, such as standards, pillars, claws, etc. It should be laid on warm, and if the work can also be warmed at the time it will be still better. All moisture and dampness should be carefully excluded.

Cement for Marble.—Stir to a thick batter with silicate of soda, 12 parts Portland cement, 6 parts slaked lime, 6 parts fine lead, 1 part infusorial earth. This is very excellent for marble and alabaster. The cemented objects need not be heated. After twenty-four hours the fracture is firm, and the place can with difficulty be found.

Cement Mortar.—About 8 parts of furnace ashes, slag, or coke, 4 parts of slaked lime, and 1 of clay, are taken and mixed dry, so as to form a cement, which, on mixing with water, sets in the ordinary way. The proportions of the materials may be varied so as to produce either an aerial or hydraulic cement.

Cleaning Paint.—Provide a plate with some of the best whiting to be had, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, apply it

to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which wash the part well with clean water, rubbing it dry with a soft chamois leather. Paint thus cleaned looks as well as when first laid on, without injury to the most delicate colours. It is far better than using soap, and does not require more than half the time and labour.

Durable Colours.—One of the necessary qualifications of the painter is the knowledge of the colours that will stand the sun and the weather. The manufactured chemical colours are generally not very durable, and are therefore not very suitable for outside work. The chrome yellows, chrome greens, and Prussian blues are fugitive, whether used alone or mixed. A combination of two colours of durable nature is often subject to change of tone. Of the more durable colours for external use, the ochres, Indian and Venetian reds, burnt and raw umbers, and burnt and raw siennas may be mentioned. Zinc white, though of less body than white lead, is more delicate and durable, and should always be used in place of white lead at the seaside, where it is especially durable. The action of the salt air injures the lead. The most durable blacks are lamp-black and vegetable black; the most durable yellows are yellow ochre and Naples yellow, both of which have a good body. Chrome yellow is fugitive, and, like other lead salts, it becomes dark in bad air. Of the reds, those to be depended on are the Venetian red, Indian red, light red, and madder lake; carmine lake, vermilion, and chrome red are best avoided on the exterior. The only blue that will stand is ultramarine, though it is expensive. Prussian blue, cobalt, Antwerp blue, and indigo will fade either singly or in combination. The umbers and siennas, burnt and raw, burnt ochres and Vandyke brown, are permanent colours. Raw umber is very durable in both water and oil, and does not injure other pigments when mixed with them. The same may be said of yellow ochre, a

natural-coloured clay, which does not lose its colour when mixed with lime, and hence it is well adapted for distemper painting. Mixed greens are not so durable as those direct from copper, arsenic, etc., which are, however, injurious to health. Emerald green made of verdigris and a solution of arsenious acid, and Schecle's green and Vienna green, arsenites of copper, are very poisonous.

Durable Limewash.—For one barrel of colour wash, ½ a bushel of white lime, 3 pecks of hydraulic cement, 10 lb. umber, 10 lb. ochre, 1 lb. Venetian red, and ¼ lb. lamp-black. Slake the lime; melt the lamp-black with vinegar; mix well together; add the cement, and fill the barrel with water. Let it stand twelve hours before using, and stir frequently while putting it on. This is not white, but of a light stone colour, without the unpleasant glare of white. The colour may be changed by adding more or less of the colours named, or other colours. This wash covers well, needing only one coat, and is superior to anything excepting oil paint.

Enamelling a Bath.—To remove the dirt, grease, etc., from a bath, make a strong lye of soda, say 2 lb. of soda to a pail of water, and well scrub it out with this. Then rub it well down with pumice-stone or glass-paper, then wipe out all the dust, etc., created. To make a good job it will want three coats of enamel. After giving the first coat let it stand for a day, after it is dry, before applying the second, and let it be two days between the second and third coats, to allow it to get thoroughly dry, a very essential point.

Enamelling upon Glass.—This is a German method for enamelling glass: A mixture of dry enamel, thick pine oil, and dammar lac is laid on the glass in a semi-dried state. After drying the drawing is pressed in. The enamel is then burned,

In this way it is possible to reproduce the forms of figures in slight relief, the hairs of animals, the feathers of birds, and the veins of leaves.

Filler-up for Nail-Holes.—As a material for filling up nail-holes in wood and broken places, the following is recommended as simple and effectual: Take fine sawdust and mix into a thick paste with glue; pound it into the hole, and when dry it will make the wood as good as new.

Filling.—A very complete filling for open cracks in floors may be made by thoroughly soaking newspapers in a paste made of 1 lb. of flour, 3 quarts of water, and a tablespoonful of alum, thoroughly boiled and mixed; make the mixture about as thick as putty, a kind of paper putty, and it will harden like papier-maché.

Filling for Cracked Ceilings.—Whiting mixed with glue water or calcined plaster and water makes a good putty for filling cracks in plastered ceilings.

Frost-withstanding Mortar.—Mortar made in the following manner will stand if used in almost all sorts of weather: 1 bushel of unslaked lime, 3 bushels of sharp sand; mix 1 lb. of alum with 1 pint of linseed oil, and thoroughly mix this with the mortar when making it, and use hot. The alum will counteract the action of the frost on the mortar.

Fugitive Colours.—Lakes and vermilions are very fugitive when exposed to the light, and an endeavour must be made to mix them so as to retain their beauty and natural colour the longest possible time. Varnish containing no resin gum has been found by experience to extend their life and beauty the longest.

Gilding on Iron.—The following directions are for putting on japan and gilding on ironwork: The articles to be japanned are cleaned of oil, usually by the use of turpentine, and the japan varnish applied, when the articles are placed in a hot oven to dry. To gild japanned articles, the part to be gilded is covered with oil size, thinned with turpentine, and gold powder put on with a puff. This is then varnished and moderately heated in an oven. Leaf gold may be applied in the same way.

Glass Window Writing.—To mix colours: You can mix dry fine colours with clear varnish or linseed oil, turpentine, and driers; also dry colours, gold size, and turpentine. By using dry colours you can obtain a good body. As to background, you can make with quick drying varnish and dry colours or gold size and turpentine; these will dry quickly. (2) Rich brown: 2 parts black, 1 part yellow, 3 parts red, 3 parts turpentine, 1 part oil, a little gold size, and terebene. Olive colour: 16 parts lemon chrome, 2 parts Prussian blue, 2 parts lamp-black, 3 parts turpentine, to 1 part oil, driers, terebene, and gold size. (3) For black letters get as much black as required (stiff), and mix with gold size and turpentine—turpentine mostly—to required thickness. Any other colour can be treated in the same way. For background use pure white lead, and mix with maple varnish and turpentine (for cream colour stain with lemon chrome and yellow ochre in oil), and stipple with a new brush. Do not paint letters and background same day, or they will work into one another.

Green or Golden Colour for Brass.—The pleasing green or golden colour generally to be found on the cheap and light brass articles of French manufacture can be easily produced at but trifling expense by the following means:—50 grms. of caustic soda and 40 grms. of milk sugar are dis-

solved in a litre of water and boiled for a quarter of an hour. (A litre is $1\frac{3}{4}$ pints.) The solution is as clear as water at first, but gradually acquires a dark yellow colour. The vessel is next taken from the fire, placed on a wooden support, and 40 grms. of a cold concentrated solution of blue vitriol stirred in. A red precipitate of suboxide of copper is at once formed, and by the time the mixture cools to 167° F. the precipitate will have settled. A suitable wooden sieve is placed in the vessel, and in this the polished articles are laid. In about a minute the sieve is lifted up to see how far the operation has gone, and at the end of the second minute the golden colour is dark enough. The sieve and articles are now taken out; and the latter are washed and then dried in sawdust. If the brass is left longer in the copper solution, in a short time a fine green lustre is produced, becoming yellow at first and then bluish green. After, it turns green, then the well-known iridescent colours finally appear. To obtain uniform colours it is necessary that they be produced slowly, at temperatures between 135° and 170° F. The copper bath can be used repeatedly, and can be kept a long time, if bottled up tightly, without change. After it is exhausted it can be renewed by adding 10 grms. of caustic soda, replacing the water that has evaporated, heating to boiling, and adding 25 grms. of a cold solution of blue vitriol.

Harmonious Colours.—A whole wall, ceiling, or other space should not be entirely covered over with rich ornament; and so also in a coloured piece of drapery or other ornamental work, it is better to have some portion of it much less rich and of less complicated pattern than the rest, and in some cases to have only a border round a single ground destitute of any pattern, as it is apt to fatigue the eye when overloaded with an equal richness of detail throughout. This is still more important in a coloured building, where, if the whole walls,

columns, and other parts are covered with elaborate and coloured patterns, the eye feels a want of repose; and the same when a building is covered entirely with sculptured ornament without colour. The richly carved part not only requires an unsculptured portion in order that it shall not fatigue the eye, but is improved and set off by the contrast; and contrast is as necessary for effect in form, quantity of detail, position of lines, as it is in colour. On this principle great effect is sometimes given to a coloured pattern by having a portion of the composition on the wall of the building without any colour at all; and for the same reason an expanse of wall in a room often looks well when painted with a single uniform ground surrounded by a rich pattern. Again, certain colours are better suited for some places than for others, and the brighter and more transparent for higher positions; and if the hangings of a room are scarlet, crimson with gold has a richer and better effect for chairs than scarlet and gold. A carpet may be darker than the general tone of the draperies, and some of its colours may be carried up by the walls or the curtains; but if the carpet is dark, the furniture shows better by being of a lighter hue. Red, or a light colour, is better than blue for table covers; and though green is not recommended for daylight, it lights up well at night, when blue does not; and this then often appears black, or when of a light tone is scarcely to be distinguished from green. Much, however, may be done to give blue its proper effect, even by artificial light, either by placing a light tone of blue close to the darker one, or by interspersing it with white, which will often lead the eye to see the darker blue, and prevent its appearing black. This may be seen in some Persian carpets where two blues are used. And if some of these have too much green for daylight, they have a good effect at night, except when in excess. Dark green, like dark blue, looks darker by artificial light. Colours that harmonise well may

appear less pleasing, in consequence of each not being properly placed next to a neighbouring one that accords well with it. Every one must have observed that certain colours, when brought together, naturally set each other off to advantage, while others have altogether a different effect. This must be carefully attended to by every painter who would study beauty or elegance in the appearance of his work. Whites will set off well with any colour. Red sets off best with whites, blacks, or yellows. Blues with whites or yellows. Greens with blacks and whites. Gold sets off well either with blacks or browns.

Harmony of Contrasts in Colour.—Harmony of colour can only be produced by contrast, but all contrast is not harmony. Harmony is an agreeable contrast; that is, pleasing to the eye, as a chord is to the ear in music. No positive rules can be laid down for the harmony of contrasts. It appears to depend very much upon what is called "an eye for colour." The following is a useful list of agreeable contrasts:—(1) Black and warm brown. (2) Violet and pale green. (3) Violet and light rose colour. (4) Deep blue and golden brown. (5) Chocolate and bright blue. (6) Deep red and grey. (7) Maroon and warm green. (8) Deep blue and pink. (9) Chocolate and pea green. (10) Maroon and deep blue. (11) Claret and buff. (12) Black and warm green.

Hints about Ceilings.—It is a somewhat difficult matter in houses, where the ceilings are plain, and bordered by cornices of inferior design, to treat them with any amount of colour, but it is generally desirable to tint them a light tone of grey or cream to get rid of the extreme glare of pure white. Next the cornice, a simple distemper pattern, of a darker shade of the same colour, will often be found effective and useful, or one or two simple lines with stencilled corners. The tinting of the cornices must materially depend upon their design and contour:

if plain moulded cornices, they may be tinted in one or two shades, the lighter tones being always at the top or next the ceiling, and gradually darken off to the wall decoration. As a general rule, one or two of the tints of the general groundwork of the paper may be used with effect; if, however, the cornices contain the usual ill-designed and modelled plaster enrichments, care should be taken to keep them in the background, and to pick them out as little as possible, so as to avoid making their general badness of form and execution too prominent. It is well to remember a few general rules in decoration of ceilings and cornices, on which to rely when choosing colours or tints. For instance, in using what are called primary colours on moulded surfaces, remember that yellow increases, while blue diminishes in strength; the former should therefore be used on convex, and the latter on concave mouldings. All strong colours should be definitely separated from each other by light lines, fillets, or small mouldings; colours on light grounds appear darker by contrast, while those on dark grounds appear as a rule lighter. If the cornice presents any broad flat surfaces, a simple conventional flower or geometrical pattern can often be used to great advantage, care being taken not to make it too prominent; the great aim being to keep the general work subservient, and in no way to form a dark moulded frame for the mass of light ceilings. The ordinary system of stencil decoration can be carried out at a very small expense, and with a few good patterns, very good effects can be obtained on ceilings, where, generally, little or nothing is done; nor is it a very costly matter to lay on the flat ceiling small pine mouldings formed into panels and painted, with the panels filled in with some very light diaper or pattern flock paper or stencil enrichment.

How to Read the Gas Meter.—The meters, both wet and dry, in ordinary use will be found to have three indexes.

The hand on the first or right-hand index moves to the right as the figures read, and each index begins at a cipher (0) at the top, and reads 1 to 2 to 3, and so to the cipher again, which is 10. When the hand on the right index has moved to 1 it indicates that 100 cubic feet of gas have been used or passed the meter; when it points to 5 it means 500 feet, and after completing the circuit at 0 it is 1000 feet. Each of the indexes is a ten-fold multiplier of the one preceding. Single figures are used for want of room, but the multiplier is generally placed above the index: thus the right hand is "one thousand," the next to the left or middle index is "ten thousand," and the last or left-hand index is "one hundred thousand." Therefore on the first or right-hand index, 1 on the dial stands for 100; in the middle index 1 stands for 1000; and 1 on the left-hand index stands for 10,000; and so on in this ratio with the succeeding figures respectively. To read the meter begin with the left index, and write down the figures last passed by the pointer; then write down the figure last passed on the second index, and proceed in like manner with the third or right-hand index. Now add two ciphers (00) and it will give the amount of gas registered in cubic feet. Suppose the first index was 2, the second index 5, and the third index 6, making 256; now add two ciphers, and you will have 25,600, being the amount of gas used in feet at that time. At the end of the month or at any other time read the meter again, and the figures will read, say 26,500, after adding the ciphers; now deduct the first sum from the last, and you will have the difference, 900, which indicates the number of feet used since the first reading.

How to Save Ceilings when Cracked.—The ceiling must be first pressed back firmly into place. To do this take two pieces of scantling long enough to reach over the defective part. Nail upon them laths about two or three inches apart. Place this framework, lath-side up, against the plastering above

them. With other pieces of scantling, reaching from this framework to the floor, support and lift it up against the ceiling, driving wedges under the floor end of the supporting scantling.

How to Use Glue.—For glue to be properly effective it requires to penetrate the pores of the wood, and the more a body of glue penetrates the wood the more substantial the joint will remain. Glues that take the longest to dry are to be preferred to those that dry quickly, the slow drying being always the strongest, other things being equal. For general use, no method gives such good results as the following: Break the glue up small, put it into an iron kettle, cover the glue with water, and allow it to soak twelve hours. After soaking boil until done. Then pour it into an air-tight box; leave the cover off until cold; then cover up tight. As glue is required, cut out a portion and melt in the usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. Never heat made glue in a pot that is subject to the direct heat of a fire or a lamp. All such methods of heating glue cannot be condemned in terms too severe. Do not use thick glue for veneering or joints. In all cases work it well into the wood, in a similar manner to what painters do with paint. Glue both surfaces of the work, except in cases of veneering. Never glue hot wood, as the hot wood will absorb all the water in the glue too suddenly, and leave only a very little residue.

Inert Pigments.—An inert pigment is one which, when mixed with oil, will have no chemical action upon it. It will have no chemical effect upon any other substance with which it is mixed, as for instance barytes, silica, gypsum, etc. On the other hand, white lead, Prussian blue, chrome yellow, etc., are

chemical colours, and are supposed to chemically affect the oil and some other pigments.

Killing the Smell of Paint.—Place a vessel of burning charcoal in the centre of the room and throw on it two or three handfuls of juniper berries. Shut the windows and doors close. Twenty-four hours afterwards the door may be opened, when it will be found that the smell of the paint has disappeared. This can be done without any injury to curtains and tapestries.

Linoleum.—This should never be touched with soap and water, but to clean it simply rub it over well once a fortnight with beeswax and turpentine, mixed in the same proportions as those used for the polishing of furniture. It should be frequently rubbed over with an old silk handkerchief, to keep it free from dust.

Making Plaster Set Quickly or Slowly.—In order to make plaster set quickly, mix it with water into which a little sulphate of potash has been dissolved. To make it set slowly, mix it with fine slaked lime. The time of setting may be regulated by changing the relative quantities.

Manganese.—The various compounds of manganese are perhaps more used than any other driers. Of these the black manganese contains most oxygen, but many regard it as less useful than umber, which contains considerable manganese, and also iron. Umber is thought by some to make a less "sensitive" oil, *i.e.* a fluid oil, or varnish, which changes less on exposure to the cold. Both manganese and umber lose some of their substance in the oil, but to what extent manganese or iron soaps are formed with the oil acids is not known. Both umber and black manganese boiled with oil darken it.

Marbleising Glass.—One method of marbleising glass consists in applying a mixture of varnish and oil to the surface of water of proper extent, and spraying or blowing upon the layer or film of oil and varnish dry coloured powders to represent the mottled, speckled, veined, or other appearance of mottled or other stone. The glass is prepared by being coated upon one surface with varnish or japan, and is then placed upon the powder supported by the oily surfaced water, and the powder immediately adheres or fastens itself to the varnish or japan on the glass. The apparatus for distributing the colour consists of a spraying device or distributor having a receptacle for the composition, which is introduced through a hole covered by a perforated cap. There is a diaphragm with holes or perforations, which are closed by a slide. This diaphragm separates the space containing the mixture from a passage or extension, the end of the casing of the passage being contracted sufficiently to fit upon the end of the bellows. To operate this device the receptacle is filled with the composition, the cap is secured in its place, and the slide lifted. The bellows are then operated, and the pressure of air drives the mixture in fine spray or drops upon the surface of the water. The device for applying the dry colours to the floating sheet or drops of oil and varnish is similar to that described; but in order that a number of colours may be sprayed or blown upon the floating oil and varnish at the same time, the receptacle is divided at the end into two or more parts, and a shaft, having agitators, is extended through them. The air is forced by bellows or other suitable means through perforations in the diaphragm. Caps cover the various chambers, etc., and are perforated to permit of the escape of the powder. In operation, the air from the bellows or other source enters the perforations in the plate, and, passing through the chambers, etc., causes the agitators to lift the powder and agitate it, and at the same time the air pressure forces the powder through the perforations in the

cap in fine streams of dust, and of course by moving the distributor, the dust may be distributed upon the floating oil or varnish as may be desired. It is obvious that the design of the marble, stone, or other article is produced upon the floating body of oil and varnish before it is applied to the glass; and it is also obvious that by coating the surface of the glass with varnish or other adhesive material of a like nature, upon placing the same with the surface having the varnish or adhesive material down, so that it shall be brought in contact with the colouring matter held by the floating surface or layer of oil and varnish, the colouring matter will immediately adhere to the japan or other adhesive coating, and will thereby become fastened to the glass, so that upon the removal of the glass the design laid out upon the floating layer of japan and oil is removed from the water, together with such of the floating oil and japan as unites therewith. Of course the colouring or mottled or other appearance of any marble or other stone, or of any other material, may be reproduced upon the glass by this process, as it will only be necessary to change the dry colours to correspond to those of the stone or article to be imitated or copied.

Metallising Wood.—A new method of treating wood, which gives it the appearance of a piece of shining polished metal, with a surface so hard and smooth as to be susceptible of a high polish, is as follows:—The wood is first steeped in a bath of caustic alkali for two or three days, according to its degree of permeability, at a temperature of between 165° and 197° F. It is then placed in a second bath of hydrosulphate of calcium, to which a concentrated solution of sulphur is added after some twenty-four to thirty-six hours. The third bath is one of acetate of lead, at a temperature of from 95° to 120° F., and in this latter the wood is allowed to remain from thirty to fifty hours. After being subjected to a thorough drying, it is in

a condition for being polished with lead, tin, or zinc, as may be desired, finishing the process with a burnisher of either glass or porcelain, the appearance of the wood being in every respect that of polished metal, having, in fact, the semblance of a polished mirror, which is unaffected by moisture.

Mixing of Colours.—All the colours which are absolutely necessary to water-colour painting consist of three primary fundamental ones, viz. red, yellow, and blue. From these an expert mixer of colours should be competent to produce nearly all possible shades and tints. The substances which serve for the colouring materials are carmine, gamboge, and Prussian blue. When carmine is mixed with gamboge, orange is obtained; gamboge and Prussian blue produce green; and from Prussian blue and carmine violet results. From the term, orange, green, violet, is meant to be conveyed the idea of a tint composed of equal amounts of the primary colours; that is to say, middle tints, which of course can be varied at will by increasing or diminishing the amount of any of the original primary colours in the mixture, thus: *Orange.*—2 parts of carmine and 1 part of gamboge give a red orange; 2 parts of gamboge and 1 part of carmine produce a yellow orange. *Green.*—From 2 parts of gamboge and 1 part of Prussian blue a yellow green is obtained; and a blue green from 2 parts of Prussian blue and 1 part of gamboge. *Violet.*—2 parts of Prussian blue combined with 1 part of carmine produce a blue violet; while 2 parts of carmine to 1 of Prussian blue give a red violet. From the above mixtures, including the primary colours, it will be seen that we have twelve different shades, viz. red, red orange, orange, yellow orange, yellow, yellow green, green, blue green, blue, blue violet, violet, and red violet. If now we change the above proportions, which were two to one, to three to one, we obtain nine additional tints, making in all some twenty-one shades. In addition, if we add to each

of these saturated colours a larger or a smaller amount of pure water, by which lighter or darker tints are produced, we shall have for each colour, by limiting ourselves to five degrees of dilution, not less than one hundred and five different shades. Besides the above colours, each of which is composed of two primary colours, we obtain all the varieties of grey and brown shades, which consist of three colours, and can be produced by this mixing. *Red Brown.*—A beautiful red brown is produced by combining 3 parts of carmine, 2 parts of gamboge, and 1 part of Prussian blue. *Yellow Brown.*—This is made by taking 3 parts of gamboge, 2 parts of carmine, and 1 part of Prussian blue. *Dark Brown or Black.*—This pigment is made by mixing together about 3 parts of Prussian blue with 2 parts each of gamboge and carmine. It is not easy to give more definite proportions for this colour, as it depends chiefly upon the taste of the artist as to which shade of brown is desirable; that is, whether it is to be bluish red, or yellowish. Also, it must be borne in mind that Prussian blue possesses greater colouring power than either carmine or gamboge, and hence blue is apt to predominate when too much of that base is used. At all events, the proportions given for the brown pigment are not to be accepted as absolute, for the formulæ are only intended to give an approximate idea of those colours which are to be used in excess in the mixture. It remains with the artist to combine the primary colours, and mix them until the desired tint is obtained. Terra sienna, red ochre, sepia, and all brown colours which are found in Nature, or are obtained artificially by chemical means, may readily be produced by properly mixing the primary colours. In practice, the employment of the natural colours, or the preparation by mixture of the primary colours, is of course at the option of the artist. *Grey pigments.*—Concerning the mixture of grey pigments there is very little to be said.

They depend essentially upon the principles that have just been given relative to the brown colours. Likewise, in this case, the blue is as predominating as in the latter, and if the dark brown or black were to be diluted with water and thinly spread out, it would be nothing but grey.

Mixing Tints.—Delicate tints of colour can only be obtained with care and trouble, and by the use of good pigments. The following will be found to be a good general list of such colours as decorators should have by them:—Chromes Nos. 1 and 2, yellow ochre, raw sienna, burnt sienna, Brunswick green — light and dark, crimson lake, vermilion, raw umber, Antwerp blue, indigo, Venetian red, black, emerald green, Dutch pink, yellow lake, Roman ochre, and ultramarine. It will be noticed that by mixing white with any colour, the pigment so lightened is at the same time rendered greyer in tone. White does not dilute colour in the sense that water or turpentine does, but distinctly alters its character. Supposing that a nice warm tone of green has been employed for a dado, and a lighter tone of the same colour is required for the upper part of the wall or "filling," to try and bring the dark colour to the right tint by adding white is to produce a distinct colour bearing little resemblance to the dark colour from which it is made. This "greying" effect that white has on colour must be counteracted by the addition of some warm colour, such as chrome, burnt sienna, etc. It is not a good plan to lighten a dark colour in order to produce a pale tint, for though the tint so produced may occasionally be pleasant, it is more often the reverse. As a general rule, do not add a light colour to a mass of dark colour which requires to be lightened, because it may take so much of the light colour to bring it to the tone desired, that far more paint may be mixed than would be necessary for the

space to be covered; rather take a separate pot with a portion of white in it, and add some of the darker colour to it, and thus see what proportion one should bear to the other. Much waste of both time and material will then probably be avoided.

Moulding Composition.—A composition for making good some slight portion of a defective moulding is made of powdered whiting with glue in solution worked into a paste, with a sufficiency of turpentine to destroy the brittleness; a little linseed oil may be added to prevent stickiness. The composition may be coloured to suit surroundings.

Moulding Wax.—To prepare wax for taking moulds, put some common beeswax into an earthenware pot, place it over a slow fire, and when it is all melted stir it into a little white lead (flake white) or plumbago—say about 1 oz. of the lead to 1 lb. of the wax. This mixture tends to prevent the mould from cracking when cooling, and from floating in the solution. It should be re-melted two or three times before using for the first time. Another kind is made thus: Melt carefully over a moderate fire 2 lb. of yellow beeswax; add $4\frac{1}{2}$ lb. of Venice turpentine, 2 oz. of lard, $1\frac{3}{4}$ lb. of purified bole, and mix thoroughly. Then gradually pour the mixture into a vessel containing water, and thoroughly knead several times with the hands. The wax should be melted at such a low temperature that no bubbles appear upon the melted surface.

Paint for Iron.—The following are anti-corrosive paints for iron: Take 10 per cent. of burnt magnesia, or even baryta or strontia, and mix it cold with ordinary linseed oil paint, and then enough mineral oil to envelope the alkaline earth; the free acid of the paint will be neutralised, while the iron will

be protected by the permanent alkaline action of the paint. Iron to be buried in deep earth may be painted with a mixture of 100 parts of resin (colophony), 25 parts of gutta-percha, and 50 parts of paraffin, to which 20 parts of magnesia and some mineral oil have been added.

Plumber's Solder.—Mix 2 or 3 parts of lead and 1 part of tin. It must be free from zinc.

Polished Floors.—These should be rubbed two or three times with linseed oil, and then polished every week with turpentine and beeswax. The oftener the oil is rubbed in to begin with, the darker the boards will be.

Preserving Painted Iron.—A method of preventing paint from detaching itself in large flakes from iron surfaces is as follows: First wash the surface to be painted with soap and water, rinse, and let day. When dry, go over it with a stiff brush dipped in hot linseed oil. When this becomes "tacky" the paint can be applied. If the object is small, and of such a nature that heating will not hurt it, raise the temperature until a drop of oil brought into contact with it "smokes." Go over the surface carefully with the raw oil, and let cool. It is now ready to receive the paint. With large objects which cannot be heated, the main point is to apply the oil as hot as possible, the nearer to boiling point the better. Objects thus painted will preserve the coat of colour for an indefinite period, the paint being unaffected by heat or cold, excessive moisture or excessive dryness. Wood exposed to the weather may be treated with good results in the manner indicated.

Preserving Putty.—Good putty is made to harden on exposure, and consequently cans should be kept closed, and a little water, or, better still, linseed oil, should be kept on top

of putty in tubs, large cans, and barrels, to prevent a hard crust from forming. A putty that shows no signs of getting stiff or hard after being open and exposed, lacks an important element of value.

Preventing Glue from Cracking.—The addition of a little chloride of calcium to glue will prevent its cracking when exposed to considerable heat.

Putty for Polished Wood.—Take a small quantity of white beeswax, melt it down, and, while liquid, mix with whiting; as it gets thick, keep adding boiled oil until you have it as you wish it; when using it, sheet the wood over solid, let stand until the next day, when you can remove the surplus by using No. ½ sandpaper. It is easier and cheaper than the shellac, and can be levelled sooner, leaving nothing but the pores or grain of the wood filled, which is better than having the wood all stained up with the shellac.

Removing Iron Rust.—Iron rust can be removed by salt mixed with lemon juiee being rubbed on; or either place the article in a bowl containing kerosene oil or wrap it in a soft cloth well saturated with the oil; allow it to remain so for two days, and then scour the rusty spots with brickdust. If very badly rusted, use salt melted with hot vitriol: after scouring well, rinse in boiling water, and polish clean with soft flannel and a little sweet oil.

Removing Spots from Ceilings.—A very simple remedy for removing rain spots or such caused by water soaking through ceilings, has been employed with good results. Take unslaked white lime, dilute with alcohol, and paint the spots with it. When the spots are dry—which ensues quickly, as the alcohol evaporates, and the lime forms a sort of insu-

lating layer—we can proceed painting with size colour, and the spots will not show through again.

Removing Oil Stains from Marble Statuary.—Make a paste with fullers' earth and hot water, cover the spots with it, let it dry on, and the next day scour it off with soap. Another recipe is to take ¼ lb. soft soap, ¼ lb. powdered whiting, 1 oz. soda, piece of blue the size of a walnut. Boil altogether for a quarter of an hour, and rub over the marble while hot. Leave it on for twenty-four hours at least, then wash off, and polish with a coarse flannel. The above quantity is quite enough for an ordinary mantelpiece.

Restoring Antique Furniture.—To restore to their original appearance antique pieces of furniture which have become unsightly on account of too frequent varnishing or besmearing by unskilled hands, the following method should be employed: Take equal parts of strong alcohol and good oil of turpentine, and heat this mixture in a bottle by placing it in hot water. With this warm liquid paint the article, whereupon the old varnish will dissolve at once. The varnish is then removed by scraping and wiping; and the spreading, scraping, and cleaning is repeated as often as necessary until the surface has become entirely clean again, so that the object may be rendered glossy, or dull, as required. This process is especially recommended, since it does not change or attack the colour of the wood, as is often the case if lye is used.

Rotten Stone.—This is sometimes harsh and gritty, and the best way of trying it is to take a little between the teeth, when the least portion of grit may be detected. Careful workmen will always wash it before they use it. This is effected by stirring the fine powder in a considerable quantity of water, then allowing it to remain at rest for a few seconds,

and pouring the water into a glazed earthen vessel; the powder which precipitates will be very fine and smooth; by washing the remainder, the whole of the finer parts may be separated from the grit.

Rust on Marble.—To remove rust from marble, an operation which depends upon the solubility of iron sulphide in a solution of potassium cyanide, is thus effected: Clay is made into a thin paste with ammonium sulphide, and the rust spot smeared with the mixture, care being taken that the spot is only just covered. After a lapse of ten minutes, this paste is washed off and replaced by one consisting of white bole mixed with a solution of potassium cyanide (1 : 4), which is in its turn washed off after a lapse of about two and a half hours. Should a reddish spot remain after washing off the first paste, a second layer may be applied for about five minutes.

Securing Brass Letters to Glass.—Every one who uses brass letters on glass windows, and knows how often they drop off from unequal expansion, or from the too energetic efforts of window cleaners, will find the following useful: Litharge, 2 parts; white lead, 1 part; boiled linseed oil, 3 parts; gum copal, 1 part. Mixed just before using; this forms a quick-drying and secure cement.

Size, or Mordant Varnishes.—One of the best mordants or sizes for signs or for work to be exposed to the weather, is called fat-oil size. It should be prepared as follows: Expose boiled linseed oil to a strong heat in a pan; when it begins to smoke, set fire to the oil, allow it to burn a moment, and then suddenly extinguish it by covering the pan. This will be ready for use, when cold, but will require thinning with a little turpentine.

Softening Putty.—When ordinary putty becomes very hard, it may be softened for the purpose of easy removal by keeping it moist for a short time with caustic potash or soda, or if the putty be painted with nitric or muriatic acid it will be softened in about an hour.

Specks.—These are liable to appear when varnish is allowed to skin over. Some varnishes will skin over although the can is constantly corked, and this skin being broken and mixing with the varnish will cause it to look sandy or seedy. The well-known common causes of specky work may be mentioned, viz. dust or pumice powder upon the job, dirt present in the air, particularly liable in loosely or badly built shops during windy weather, and "specks" or "lice" in the varnish brush due to a variety of causes.

Sponges.—New sponges should always be soaked in warm water for several hours before being used, and the water should be changed while it is at all coloured. Feel the sponge all over before using, as frequently small portions of rock remain in it, the sharp points of which scratch the paint.

Strong Glue for Damp Places.—For a strong glue which will hold in a damp place, the following recipe works well: Take of the best and strongest glue enough to make a pint when melted. Soak this until soft, pour off the water as in ordinary glue-making, and add a little water if the glue is likely to be too thick. When melted add three tablespoonfuls of boiled linseed oil. Stir frequently, and keep up the heat till the oil disappears, which may take the whole day, and perhaps longer. If necessary, add water to make up for that lost by evaporation. When no more oil is seen, a tablespoonful of whiting is added and thoroughly incorporated with the glue.

Sulphate of Manganese.—This is a pink-coloured salt, useful, especially with zinc white, for exposure to sulphur gases. The following is the formula for its use: Sulphate of manganese, 1 part; calcined sulphate of zinc, 1 part; and acetate of manganese, 1 part. These must be ground and sifted into a fine powder, and then dusted over 97 parts of zinc white. Another method for its use is: 6 to 8 oz. of sulphate of manganese to 100 lb. of ground zinc white paint, the powder thoroughly mixed with a portion of the paint, and this portion thoroughly mixed with the whole. Unless care is taken in the mixing, the work may be spotted.

Taking Grease out of Boards.—Pipeclay and water mixed together until they form a thick paste, and spread over the part where there is a stain, will take out the grease very soon. Other plans are to cover the part thickly with dry fullers' earth, or a mixture may be made of 5 parts of fullers' earth to 1 part each of pearlash and soft soap with boiling water to make a paste; lay it on quite hot, and leave till dry (say all night), and then scour it with soap or silver sand and water. For simply making the boards a good colour and to keep them free from insects, use the following mixture:—$\frac{1}{4}$ lb. of lime and $\frac{3}{4}$ lb. of sand to $\frac{1}{2}$ lb. of soft soap. Lay it on the boards and scrub it in well; wash it off with clean water, and make it as dry as possible. If ink should be spilt on boards, it may be removed by the application of muriatic acid, and afterwards simply washed. For painted boards, either on the floor or wainscoting, nothing better or more cleansing can be used than fullers' earth, with or without soap.

Testing Plaster of Paris.—The method of testing the quality of plaster of Paris is by taking a small pinch of the powder between the finger and thumb and gently rubbing it; if small particles of it are felt, grit indicates that parts of the

plaster have already absorbed water, and it is therefore unfit for use. The same test may be observed by taking a pinch of the powder again and placing the fingers under water, and then rubbing the same way as before. If, however, in both of these tests no grit is felt, and under water a thin creamy substance is found, which is easily rubbed off the fingers, the plaster is in a proper condition for use.

To Clean White Marble.—Mix together ½ lb. of pearl-ash, ½ lb. of soft soap, and 1 lb. of whiting. Boil them until they become as thick as paste, and let the mixture cool. Before it is quite cold spread it over the surface of the marble and leave it for at least a whole day. Use a soft water to wash it off, and rub it well with soft cloths. For black marble nothing is better than spirits of turpentine.

To Perforate Glass.—In drilling glass, stick a piece of stiff putty or clay where the hole is required, and make a hole in the putty the size required, reaching down to the glass. Pour a little molten lead into the hole, and if the glass is not too thick, the piece will at once drop out.

To Polish Marble.—To polish marble, such as table-tops, etc., the following mode is followed by masons:—With a piece of sandstone with a very fine grit rub the slab backward and forward, using very fine sand and water, till the marble appears equally rough, and not in scratches; next use a finer stone and finer sand, till its surface appears equally gone over; then, with fine emery powder and a piece of felt or old hat wrapped around a weight, rub till all the marks left by the former process are worked out, and it appears with a comparative gloss on its surface. Afterwards finish the polish with putty powder and fine clean rags. As soon as the face appears of a good gloss, do not put any more powder on the rag, but rub it well, and

in a short time it will appear as if fresh from the mason's hands.

To Remove Rust.—A mixture of paraffin oil and emery powder rubbed on with a piece of tweed cloth makes steel as bright as a button. But, as "prevention is better than cure," we may add that to prevent the formation of rust the bright steel should be painted with wax varnish, made by dissolving 1 part of solid paraffin in 15 parts of benzole. This is a much more cleanly application than such fatty compounds as blue ointment, and is well suited for steel grates, fireirons, and similar goods.

Transparent Paints for Glass.—Take for a blue pigment, Prussian blue; for red, crimson lake; for yellow, Indian yellow; for brown, burnt sienna; for black, lamp-black; and for other shades a mixture of the appropriate colours. Rub them in a size made as follows: Venice turpentine, 2 oz.; oil of turpentine, 1 oz.; and apply with a brush. For temporary purposes, fine and brilliant colours are obtained by dissolving aniline dyes in white shellac varnish; but they are fleeting colours, and do not always pay for the trouble.

Useful Size.—A useful preparatory size can be made by boiling a handful of the leaves of wormwood and two or three heads of garlick in a quart of water, until the liquid is reduced to one-half; then strain it through a cloth, and add half a handful of common salt, and nearly half a pint of vinegar. The design of this composition (usually employed in gilding looking-glass and picture frames) is to obviate the greasiness of the wood, and prepare it the better to receive the coats which are to be laid on, and to preserve it from the ravages of worms. When used it is mixed with a sufficient portion of good glue, boiling hot. In applying it to the gilding of plaster or marble, the salt must be left out of its composition, as, in damp

situations, this would produce a white saline efflorescence on the surface of the gold.

Varnishes for Engravings, Paints, and Maps.—(1) A piece of plate glass is heated, and while yet warm a little wax rubbed over it; water is then poured over the plate, the moistened picture laid thereon and pressed closely down by means of a piece of filtering paper. When dry the picture is removed, and will be found to possess a surface of great brilliancy, which is not injured by the process of mounting. (2) Boil Chio turpentine till brittle, then powder and dissolve in oil of turpentine. (3) Canada balsam and clear white resin, of each 6 oz.; oil of turpentine, 1 quart; dissolve. (4) Digest gum sandarach, 20 parts; gum mastic, 8 parts; camphor, 1 part; with alcohol, 48 parts. The map or engraving must previously receive one or two coats of gelatine.

Waterproof Glue.—(1) Dissolve $\frac{1}{2}$ oz. each of gum sandarach and mastic in 8 fluid oz. of strong alcohol (or methylated spirits), to which add $\frac{1}{2}$ oz. of turpentine. Put the dissolved gums into a double glue-pot; add by degrees a hot thick solution of glue to which isinglass has been added; stir the whole over the fire until all the ingredients are thoroughly incorporated. Next strain through a cloth while hot, and it is ready for use. It may now be returned to the glue-pot, and $\frac{1}{2}$ oz. of very finely powdered glass added to it. It should be used quite hot. (2) Take of shellac, 3 parts; indiarubber, 1 part, by weight. Dissolve each separately in ether free from alcohol. It is best to do this in stoppered bottles and without heating, as the ether readily evaporates. When solution is complete, mix the two, and keep well stoppered for use.

Waterproof Wash for Lime.—This may be made by mixing the powder from 3 parts silicious rock (quartz), 3 parts

broken marble and sandstone; also 2 parts burned porcelain clay with 3 parts freshly slaked lime, still warm. In this way a wash is made which forms a silicate if often wetted, and becomes finally like stone. It is applied thickly to the surface, allowed to dry for a day, and the next day frequently wetted, which makes it waterproof.

Whitewash that will not Rub off.—Mix up half a pailful of lime and water, ready to put on the wall; then take $\frac{1}{4}$ pint of flour, mix it with water, then pour on it a sufficient quantity of boiling water to thicken it, and pour it while hot into the whitewash; stir all well together, and it is ready for use.

Writing on Glass.—To write on glass, or, as it is properly termed, to etch, as the letters are eaten out by an acid, you require either liquid hydrofluoric acid or hydrofluoric acid gas, according to the effect you wish to produce. The former eats away the glass but leaves it clear; the latter gives the part operated upon a ground-glass appearance. For the first way, clean a piece of glass, warm it, rub over with white wax or beeswax, and trace the letters with a needle or penknife, going down to the surface of the glass; make a wall of wax all round the edge of the glass, and pour on hydrofluoric acid, and leave for two or three hours, then clean with turpentine. To produce letters with a ground-glass appearance, place in a leaden dish 2 parts of powdered fluoride of calcium, pour on 3 parts of sulphuric acid, and with a stick mix into a paste. Prepare the glass as before, except that there is no need for a wall of wax round the edges; cover the leaden vessel with this piece of glass, and by warming the vessel gas will be evolved which will attack every clear part of the glass. We must caution the workmen to be very careful indeed in using the acid of the gas; the fumes, if breathed, are highly injurious, causing ulcers

on the lungs; whilst drops of the acid on the skin will act like a red-hot iron, and produce very painful sores, which are not very easily healed. Opal can also be treated as described above, and the letters coloured or enamelled afterwards; or you can use china colours, and have the opal fired. White letters on coloured glass may be obtained by using flashed glass, and treating the flashed side with acid, which is soon eaten through, leaving the plain glass underneath.

Zinc Sheeting Paints.—A very durable weather-resisting paint for zinc sheets is made by mixing oxide of zinc with a fluid silicate, such as water-glass and potash and soda, to which the required pigments are added. The proportion should be about three-quarters of a pound zinc white to every pound of silicate, with or without water. This zinc silicate paint becomes insoluble in water in about twenty-four hours. It is equally useful for interior and outside work, but it must not be applied to greasy surfaces, nor to old coats of paint. New zinc, not being oxidised, should first be prepared by the application of a solution of 1 part of soda in 10 parts of water, and then be thoroughly washed with water only. A quick-drying, weather-resisting paint of dark colour for zinc sheets is made by mixing 5 lb. of graphite (plumbago) with 1 gallon of vinegar. The oxidised surface of the zinc, previously well brushed, is painted with the above, one coat giving a sufficiently dark colour. New sheet zinc, however, requires two coats, and must first be oxidised by the following application, which is not strong enough to cause any deterioration of the metal:—1 part each of chloride of copper, nitrate of copper, and sal ammoniac, dissolved in 64 parts of water, and 1 part of hydrochloric acid added to the solution.

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